THE GRAY SHEET

Computer Industry

REPORT

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Computer Industry
REPORT

PETER L. BURRIS, EDITOR APRIL 25, 1988 • VOL. 23, NO. 24 PATRICK J. MCGOVERN, PUBLISHER

IDC Raises Mainframe Shipment Value Forecast—Inside pp. 5&6

Mainframe Demand on a Sustainable Rise? Or a Blip in an Otherwise Flat Market?

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Question: What changed about the large-scale systems market in1987?

Answer: Not a whole lot.

The last year of dramatic overall change was 1984, during which worldwide units shipped jumped nearly 19%, shipment value rose a mighty 10.5%, and IBM was prognosticating that demand for mainframe processing power would increase at a CAGR of between 60-80% for the foreseeable future.

Of course, in retrospect we know that IBM's crystal ball was a little on the fritz. Since then the mainframe market has been essentially flat in terms of both growth and general customer enthusiasm.

That is not to say that the large-systems market has been without drama. On the contrary, among other things supercomputing has entered the mainstream, the Bunch is now reduced to UCH, and Amdahl and NAS are giving credence to the "Japanese threat" banter heard earlier this decade (but not solely by threatening IBM's low-cost position, as Armonk earlier had feared, but also by providing equipment more practical than IBM's Sierra stuff).

Moreover, as leadership in the computer industry has been jostled by downsizing, IBM's financials have been plagued by a bottomless line.

Quickly reviewing 1987, the *Gray Sheet* finds that it was a year in which the more things have changed in the computer industry, the more they have remained the same in the large-scale systems segment:

- Worldwide unit shipments crept up just under 3%. But that figure is relative to 1986, a year in which mainframe ships fell nearly 7%. On balance there were fewer 1987 large-scale system ships than during 1985.

- The number of large-scale units installed worldwide likewise grew just under 3%.

- The value of worldwide shipments, which reflects the value of both processors and associated peripherals (in particular DASD), grew just over 5%, to nearly $19 billion. But note, the machinations of international currency conversions accounted for almost the entire rise. Indeed, the value of large-system ships to the U.S. fell nearly .5%.

- The IBM base (IBM plus the PCMs) share of worldwide mainframe shipment value climbed about 1%, to 82% of the total. But IBM's share decreased nearly 2%, to 73% of the total.

The Mainframe Generation Gap

The last two points highlight a fundamental factor of mainframer paralysis: an inordinately weak generational transition to IBM's Sierra family of 3090 mainframe equipment.

In some ways, the strategic responses to weak mainframe product cycles have fueled, not doused, the problem. A vicious cycle has arisen.

The Evolution of IBM's Largest Uniprocessor Technology

(Source: International Data Corporation, 1988)

	S/360-50	S/370-158	3033	3083J	3090-180	3090-180E
First Ship Date	1/65	4/73	3/78	3/82	3/86	5/87
CPU Cycle Time	500ns	115ns	57ns	26ns	18.5ns	17.2ns
MIPS	0.2	1.0	5.0	8.0	14.3	16.5
Max Main Mem	524KB	6MB	24MB	32MB	64MB	64MB
Disk Capacity	112.8MB	560MB	635MB	2.5GB	7.5GB	7.5GB
Channel Speed	450KBps	1.5MBps	1.5MBps	3MBps	4.5MBps	4.5MBps
Mem Chip Size	mag core	2Kb	2Kb	64Kb	288Kb	1MB
Virtual Address	N/A	16MB	16MB	2GB	2GB	16TB

NOTE: MIPS are a relative, not absolute, measure of processor performance. IDC bases MIPS ratings on vendor claims. Absolute performance varies according to system configuration and application workload.

One of the things that downsizing has meant to the large-scale systems business is minicomputers have arisen as viable substitutes to host-connected devices for distributing processing power. No longer are information system purse strings programmed to yield every time a new mainframe gadget is released. Customers are shopping around for, evaluating, and buying alternative approaches to meeting processing needs.

Cognizant of this, most traditional mainframers, including IBM, have focused most of their efforts in the past two years or so on their midrange. Only Amdahl and NAS have fully concentrated on their mainframe business. Perhaps it is no coincidence, then, that during this time only Amdahl and NAS have been enjoying great success in the mainframe market.

One of the things IBM may have put on the back burner to attend to growing midrange problems could have been efforts to differentiate the 3090s from the 308Xs. The *Gray Sheet* has heard that IBM's new large-scale systems architecture, Enterprise Systems Architecture (ESA), was originally to be released a year ago with the introduction of the 3090 E-models.

The *Gray Sheet* speculates that the delay was due to IBM's all-out effort to ready software for the 9370. This undertaking was known to be massive, and there are only so many S/370 systems programmers available, even to IBM. Moreover, IBM might not have wanted to steal the thunder of another architecture, Systems Application Architecture (SAA), which was announced two months after the E-models.

Because the 3090s haven't been shown to provide undeniable advantages over the 308Xs, a schism has developed between IBM's largest and smaller mainframe customers. The smaller mainframe customer segment has not been leaping at the 3090s, but has instead been standing pat or looking elsewhere.

Many of them are still satisfying their de-

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mand for new mainframe processing power with 308X purchases. IDC believes 14% of mainframe shipments in 1987 were upgrades from 3081s, today at least four-years old, to 3084s.

This is no small problem for IBM. Now three years into the Sierra cycle, a little over a quarter of IBM's worldwide large-scale-system installed base is 3090s. At a comparable time in the 308X cycle, almost 37% of that total was 308X machines. Clearly, the long-time buying pattern, in which mainframes were automatically turned over every four years, is no longer in force.

In contrast, IBM's large mainframe customers *have* been voraciously devouring MIPS in huge bites of multiple-CPU 3090s, but not DASD — at least not IBM's DASD, due to another product cycle snafu. In 1986, the peripherals market turned thumbs down on the 3380Ds, which resulted in a double-digit drop in shipment value of IBM disk. In 1987 it waited for 3380 Js and Ks, leading to a single-digit downturn.

No demand on one hand, and unbalanced demand on the other, led to, in this case, abysmal growth. To complete the cycle, weak large-scale-system demand during a time of midrange expansion may have led IBM to reinforce its midrange commitment at the expense of its mainframe business, which could have perpetuated the problem.

The PCMs Seize the Opportunity

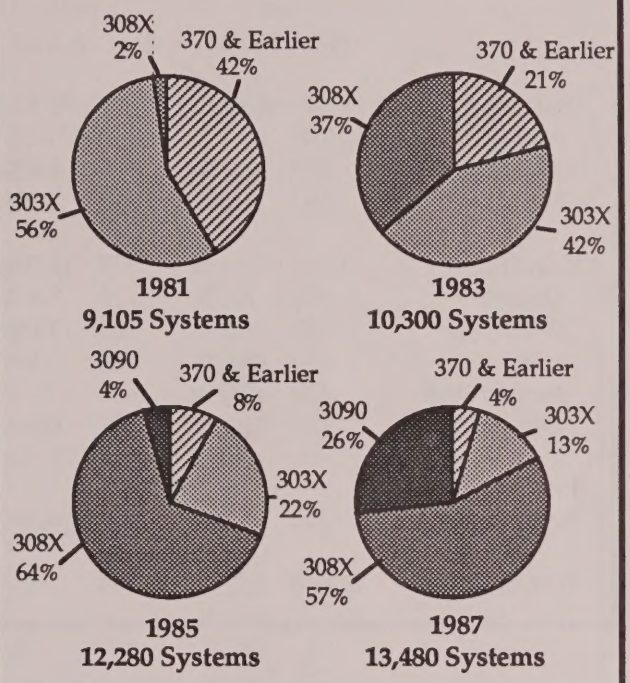
That total large-scale systems market growth has slowed is indisputable. That different fortunes became different strategies for dealing with the downturn is likewise obvious.

The PCMs have done very well in spite of the slack mainframe market by directing their energies to couple superior price/performance and comparable support and service alternatives with a number of unique extensions to plug compatibility that mainframe users apparently find very valuable.

The extensions deserve special mention, because they have forced IBM to react like a PCM

Worldwide Installed Base of IBM Large-Scale Systems By Generation, 1981—1987

(Source: International Data Corporation, 1988)



to its own PCMs. Amdahl's Multiple Domain Facility (MDF) has been particularly successful — recent IDC surveys find approximately 30% of Amdahl's base indicate MDF as a lure. This success may well have precipitated IBM's February introduction of PR/SM, and may eventually contibute to demand for IBM's 3090s. Better than 50% of IBM-compatible mainframe users have indicated intentions to install the PR/SM feature at their site.

PCM innovation continues. Last month, NAS became the first DASD vendor to employ 9.5" platter technology. Its new 7380 models J and K offer equal capacities to IBM's 3380 J and K, but require less floor space, and have shorter seek times. Demand for the 3380 Js and Ks remains strong, but IDC believes once again IBM will be forced to match a PCM initiative.

The PCMs hold one other advantage over IBM: they're not IBM. In the U.S., perhaps as many as 10% of PCM customers buy PCM to

(continued on page 6)

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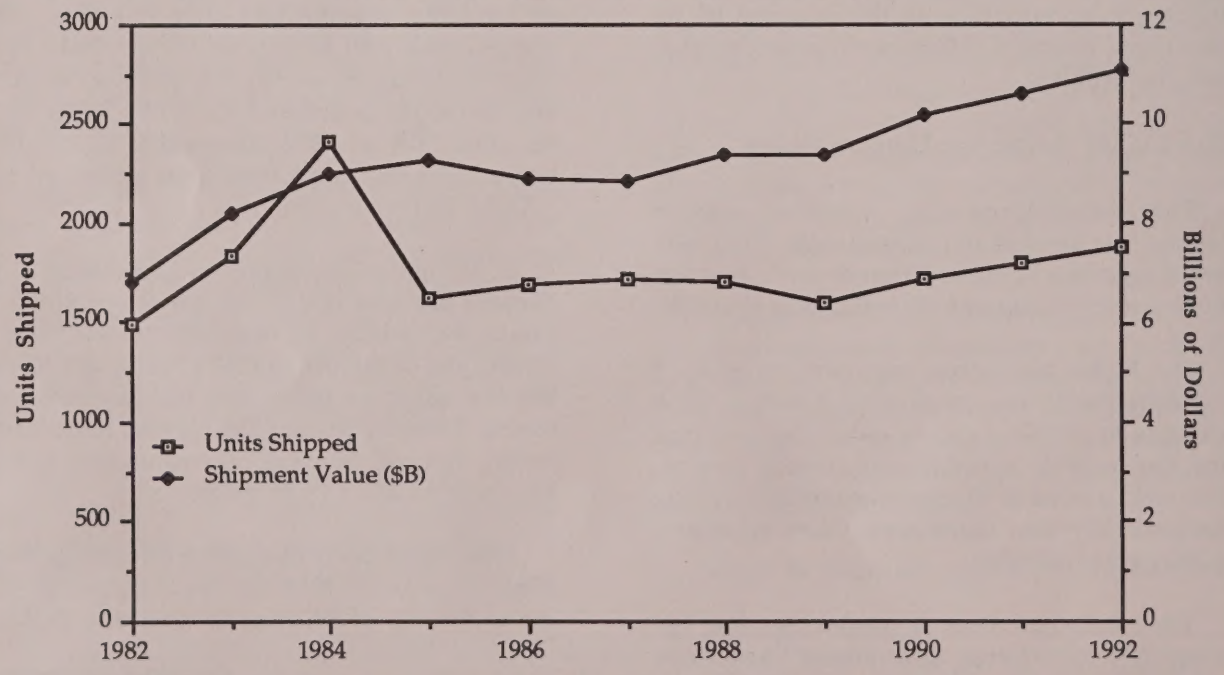
U.S.-Based Vendors' Worldwide Value of Shipments
Large-Scale Systems, 1983-1987

(Source: International Data Corporation)

	1983		1984		1985		1986		1987	
	$M	% Mkt	$M	% Mkt	$M	% Mkt	$M	% Mkt	$M	% Mkt
IBM Base	11,640	80.3%	12,750	79.5%	13,720	80.8%	14,300	81.5%	15,230	82.1%
IBM	10,760	74.2%	11,750	73.2%	12,670	74.7%	13,100	74.6%	13,500	72.8%
Amdahl	590	4.1%	660	4.1%	690	4.1%	750	4.3%	1,130	6.1%
NAS	290	2.0%	340	2.1%	360	2.1%	450	2.6%	600	3.2%
Non-IBM	2,150	14.8%	2,575	16.0%	2,730	16.1%	2,690	15.3%	2,740	14.8%
Unisys	950	6.6%	1,410	8.8%	1,610	9.5%	1,400	8.0%	1,390	7.5%
Cray	130	0.9%	165	1.0%	240	1.4%	450	2.6%	520	2.8%
CDC	470	3.2%	480	3.0%	400	2.4%	420	2.4%	420	2.3%
Honey.Bull	430	3.0%	430	2.7%	460	2.7%	410	2.3%	410	2.2%
Digital	170	1.2%	90	0.6%	20	0.1%	10	0.1%	0	0.0%
Third-Party Peripherals	710	4.9%	720	4.5%	520	3.1%	560	3.2%	580	3.1%
TOTAL	**14,500**		**16,045**		**16,970**		**17,550**		**18,550**	

U.S. Large-Scale Systems Market—U.S.-Based Manufacturers

(Source: International Data Corporation, 1988)



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LARGE-SCALE SYSTEM MARKET — U.S.-BASED MANUFACTURERS

(Source: International Data Corporation, 1988)

	Number of Systems Shipped	Cumulative Number in Use	$ Million Value Shipped	$ Billion Value in Use
		WORLDWIDE		
1982	2,280	15,190	11,140	68.3
1983	3,370	16,700	14,500	78.8
1984	4,010	18,640	16,045	89.1
1985	3,270	19,780	16,970	97.2
1986	3,050	21,550	17,550	106.0
1987	3,140	22,170	18,550	114.9
1988	3,150	23,000	20,000	124.0
1989	3,020	23,700	19,900	133.0
1990	3,170	24,500	21,000	142.8
1991	3,320	25,200	21,800	152.3
1992	3,460	26,000	22,700	162.5
		UNITED STATES		
1982	1,490	8,830	6,810	41.1
1983	1,840	9,590	8,190	46.3
1984	2,410	10,860	8,990	52.3
1985	1,630	11,270	9,290	57.1
1986	1,690	12,340	8,880	61.6
1987	1,720	12,710	8,850	66.1
1988	1,700	13,100	9,400	70.7
1989	1,600	13,500	9,400	75.2
1990	1,720	13,900	10,200	80.1
1991	1,800	14,200	10,600	84.8
1992	1,880	14,600	11,100	90.0
		INTERNATIONAL		
1982	790	6,360	4,330	27.2
1983	1,530	7,110	6,310	32.5
1984	1,600	7,780	7,055	36.8
1985	1,640	8,510	7,680	40.1
1986	1,360	9,210	8,670	44.4
1987	1,420	9,460	9,700	48.8
1988	1,450	9,900	10,600	53.3
1989	1,420	10,200	10,500	57.8
1990	1,450	10,600	10,800	62.7
1991	1,520	11,000	11,200	67.5
1992	1,580	11,400	11,600	72.5

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strike a better bargaining position with IBM.

Overseas the desire to minimize dependence on IBM for large-scale systems may be even greater. Since the 1984 settlement between IBM and the EEC, in which IBM promised to release channel and hardware-to-software interface specs within 120 days of new product announcements, IBM has lost significant international market share to U.S.-based PCMs.

How significant? As recently as 1985 IBM's share of its U.S.-based compatible international market was as high as 90%. By 1987 that figure has plummeted to 77%. The result is a 4% slip in share of the international IBM-compatible installed base for Big Blue.

This during a time when the poor performance of non-U.S.-based PCM vendors might have opened doors otherwise closed to IBM, and favorable exchange rates inflated earnings. The international opportunity's knock was not as clearly heard by Goliath as it was by the Davids.

New Mainframe Blood: ESA

IBM is no longer sitting still as PCMs advance. The creation of the Enterprise Systems Group (ESG) in IBM's January restructuring guarantees that more attention will be paid to Big Blue's bread and butter large-scale systems business. ESG's activities have in three months time already generated equal or more excitement in the mainframe industry than in the three previous years combined.

The spark is ESA, a new architecture comprised of MVS operating system programs for IBM's 3090 E-models and their replacements (see the *Gray Sheet*, March 4, 1988, V. 23, No. 21) that could significantly improve the performance of IBM's largest processors.

Recently, in a major software presentation, Big Blue announced that most of the major software subsystems required to make ESA fully operational will be available by year's end. The rollout commences in August with general availability for the base MVS/ESA code. IBM has stoked its competitive engines to flood the market with products, creating advantages for its newest large-scale systems.

Or looked at another way, to once again immerse the mainframe market in FUD. IDC's quarterly large-scale system buying intention surveys show a marked shift in sentiment since February's ESA announcement. Of particular importance is the change in attitude of 3081 users who indicate a greater preference for buying into the 3090 family at the Model 200 point than in earlier surveys.

Indeed, the overall demand swing is dramatic enough to suggest an increase in IDC's 1988 forecast for worldwide large-scale shipment value growth to 8%. This change is reflected in the figures on page 5.

Among the current 3090 E-model user base, other IDC survey work leads the *Gray Sheet* to believe that the pattern of ESA migration will be very similar to that which characterized the move to XA. Expect 20-25% of IBM's E-model customers to migrate within one year of general availability, and another 35-40% to migrate by mid-1990. By the time IBM introduces "MVS/XC," sometime in the 1992 time frame, fully 70% of the ESA-capable base should be operating under ESA.

Plug compatibility, which during the Sierra cycle fattened the coffers of Amdahl and NAS, could spell more difficult times during the ESA transition. After all, plug compatibility means low switching costs, and that works both ways. Just as an IBM account had been fair game to the PCMs, so now is a PCM account fair game to IBM.

Until the PCMs can prove ESA-compatibility, perhaps 12-18 months after the code is released this June, newly pressed Big Blue suits will be out in force wining and dining mainframe customers that strayed from the IBM fold. Not surprisingly, PCM accounts where a single plug-compatible machine is installed among IBM machines seem to be most susceptible.

IBM will keep the heat on the PCMs over the next two-and-a-half years by introducing a

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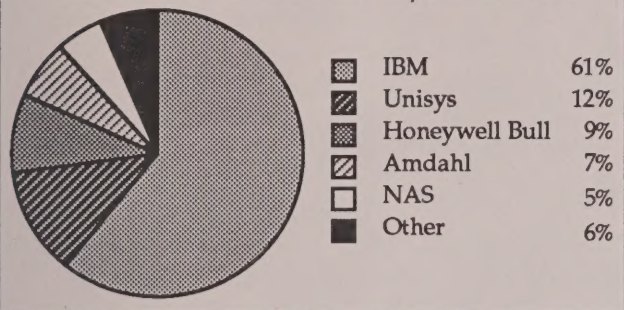
Market Shares of U.S.-Based Vendors' Worldwide Installed Base of Large-Scale Systems as of January 1, 1988
(Source: International Data Corporation, 1988)



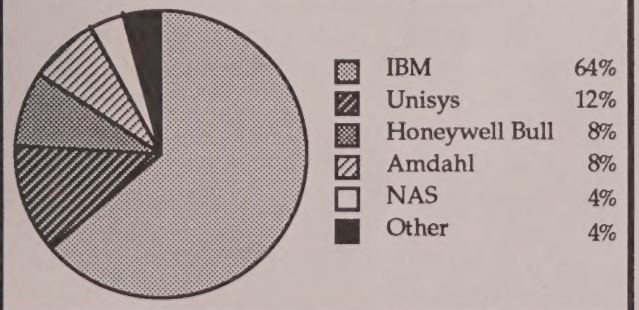
new 3090 family of kicker models — the F-series (3Q88 announce, 1Q89 ship) — to be followed by the next generation of IBM mainframes, known throughout the industry as the Summit class (1Q90 announce, 4Q90 ship).

ESA will continue to play a pivotal role in IBM's large-scale systems strategy. Both the F-series and Summit are expected to incorporate hardware technology specifically designed to exploit the new operating environment — technology that could make the ESA migration even more trying for the PCMs. In all its splendor, Summit's peak could reach 300-400 MIPS by 1992.

Et al.

Of course, if downsizing is truly endemic to the mainframe market and current problems are not simply a function of weak product cycles, that peak, glorious as it might be, could be home to few inhabitants, either vendor or customer.

Market Shares of U.S.-Based Vemdors' Worldwide Unit Shipments of Large-Scale Systems, 1987
(Source: International Data Corporation, 1988)



Only certain segments of the technical market seem *uniformly* concerned with bulking up on MIPS, or BIPS as the case may be. Cray continues to add market share, and for the first time in a long time new vendors have begun to show up on the IDC large-scale systems census.

Non-IBM-compatible mainframers, such as Unisys, Honeywell Bull, and CDC, appear destined to continue a cautious tack. To forestall a rapid erosion of their large-scale system installed base they will continue to strive to satisfy their most performance-demanding customers, but the grand slice of their competitive efforts will probably be directed to distributed processing markets.

Looking more like midrange vendors, they will join Digital in a race for share of the business traditionally characterized as the low-end of the mainframe market. DEC has quite a jump, however, and has formulated aggressive plans to capture and control the thinning line between mainframe and minicomputer (see the ***Gray Sheet***, April 11, 1988: V.23, No, 22-23).

Make no mistake; the low end of the mainframe market is not about to lose its identity. Nearly one half of the mainframe sites quarterly queried by IDC's buying intention surveys continue to express the belief that they have sufficient mainframe power for the next 12 months.

Large increases in shipment value do not automatically translate into large increases in the number of units shipped. In fact, IDC has *not* drastically altered its units shipped forecast. Instead, the average unit shipped is expected to be larger and have greater value.

The schism between large and small mainframe customers will apparently continue for a while. Some are preparing a Sierra leap of faith; others are still very much uncertain of the long-term utility of the market's largest machines. Depending on the redistribution of their numbers, the resurgence in mainframe enthusiasm could well be temporary.

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IBM ROLLS OUT BIG SOFTWARE GUNS. Armonk is putting bite into its ESA message. By year's end, most of the major software subsystems for Big Blue's new mainframe operating environment will be available. Included are new versions of JES2, JES3, TSO/E, CICS, RACF, and the DFP set of programs.

Also introduced was a new version of DB2. DB2 V2 incorporates for the first time a measure of referential integrity, a major customer requirement. Still missing are an active dictionary facility and the capability to update views.

IBM reports DB2 V2 performance improvements 50-300% better than DB2 V1.3 when running under MVS/ESA on a 600E in a *laboratory* environment, i.e., with almost all relational facilities turned off so the program works similarly to IMS. Why IBM would benchmark the new release without using its most powerful features is anybody's guess.

ARRIVEDERCI, CASSONI. As Robert Allen steps up to become AT&T's chairman after the sudden death of James Olsen, Vittorio Cassoni steps out. He will be returning to Ing. C. Olivetti & Co, where he is expected to be named managing director of the Olivetti Group. Replacing Cassoni as president of AT&T's Data Systems Group will be former management consultant and AT&T CFO Robert M. Kavner.

Personal praises resounded, and strategic continuum was assured. Specifically, Kavner stressed the need for solid relationships with key partners.

But on the heels of AT&T's decision not to increase its investment position in Olivetti, and each vendor's well-known dissatisfaction with the other's sales efforts, the *Gray Sheet* can't help but wonder what this move portends. As Allen moves to make AT&T his own, what will become of the coupling between not only AT&T and Olivetti, but AT&T and anyone else?

SMALLER ROLE FOR COPIERS IN IBM'S BIG PICTURE. For an undisclosed price, Kodak has agreed to purchase IBM's copier service business and existing domestic copier sales agreements. IBM will continue to manufacture copiers, but will not maintain a copier-specific sales and service force. Copier sales and service personnel at IBM will be given opportunities to take up with Kodak, or transfer within IBM.

MINICOMPUTERS IN BLOOM. From Hewlett-Packard, Digital, and IBM spring forth new and enhanced midrange processor lines.

Hewlett-Packard's new additions to its RISC-based Spectrum Series 3000-9XX family were the first to blossom. The entry-level 925 and 925LX, the 935, and the 955 range in base list price from $50K for the 925LX to $390K for the 955, and support, respectively, 32 to over 400 commercial users.

Digital's new 6200 family combines, as expected, CMOS technology from the MVAX 3000 and the VAXBI bus from the 8XXX. The four members make up the second midrange family from Digital to run VMS 5.0, DEC's new symmetric multiprocessing operating system for the VAX. Prices are steep, ranging from $170.5K for the single-CPU 6210 to $537K for the four-CPU 6240.

Hidden behind its large-scale software announcement, **IBM's** ESG introduced two interesting features for the 9370. One is a cluster capability that will allow 9370s to share common disk volumes. Another is a load-and-go option for volume purchases. Customers can develop an application, download the code to tape, ship the tape to ESG, and ESG will install what amounts to a customized 9370 turnkey system. Moreover, perhaps reflecting 9370 demand demographics, DOS/VSE was enhanced.

MOTOROLA MOVES TO MAXIMIZE RISC. Motorola's new 88000 family is the first RISC chip to integrate the floating point and integer processing units on the same chip. Moreover, the company's implementation employs a total cache solution. Both data and instructions are cached to better feed tasks to the processing units. The result is an efficient design that is said to provide 17 VAX MIPS. Two notable vendors committed to developing future products based on the 88000 are Data General and Stratus.

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Neoniches and Desktop Riches: The Only Constant in the Technical Workstation Market Is Money

Desktop and deskside computers that promise to continuously deliver 20 million instructions per second (MIPS), 6 million floating point operations per second (MFLOPS) Linpack, and 150,000 3D/vectors per second could radically alter product development life cycles. And at less than $100K, this power could be within reach of many technical users, not just the ones who can eke out a precious few moments on a supercomputer or minisuper.

Previously, to study complicated objects scientists or engineers had to synthesize reams of supercomputed data and contemplate mental pictures of the results. Existing computer technology might supply graphical frames of reference, but in disciplines such as mechanical computer-aided design (MCAD), computer-aided engineering (CAE), computer-aided manufacturing (CAM), and newer areas of commercial interest like fluid dynamics and biotechnology, integration was left to the imagination.

One of the colloquial terms (suitable for repeating in the *Gray Sheet*) for the inglorious exercise that in the past has linked the research, design, engineering, manufacturing, and marketing functions of most fims is "throwing it over the wall." As each function completes its contribution to the creative process, it tosses the output, and responsibility for success, to another function. This rigid sequential process breeds turf guarding and strained diplomacy among functions, not creative cooperation.

Incorporating downstream suggestions requires tremendously costly and annoying adjustments on the part of the upstream function, which has probably long since undertaken another, more interesting project. Midstream ideas routinely lead to, at best, negotiation and compromise; at worst, power-plays and animosity. Innovation, quality, turn-around time, and ultimately customers, suffer; inefficiency and corporate bureaucracy prosper.

With these newer machines, visual simulation and real-time analysis of extraordinarily complex systems may now be possible. Product iterations could become nearly instantaneous instead of taking days or months. Innovation, quality, turn-around time, and ultimately customers would profit. And so would U.S. manufacturing firms, from greater flexibility and more efficient product life cycles.

This exciting and ever-unfolding technological drama is brought to you by the most innovative attackers in the computer industry: technical workstation vendors. Six years old in 1987, the technical "niche" in the workstation market has grown into a $2.7 billion market for U.S.-based vendors. In 1992 IDC estimates $4.6 billion will flow to U.S.-based vendors of technical workstations, but by then, only a definitional *pas de deux* by analysts and vendors will maintain its niche status.

Competition, by Definition

The dance has already begun. At the low end of the market, two leaders, Apollo and Sun, have been waging a price and marketing battle to put technical workstations on professional

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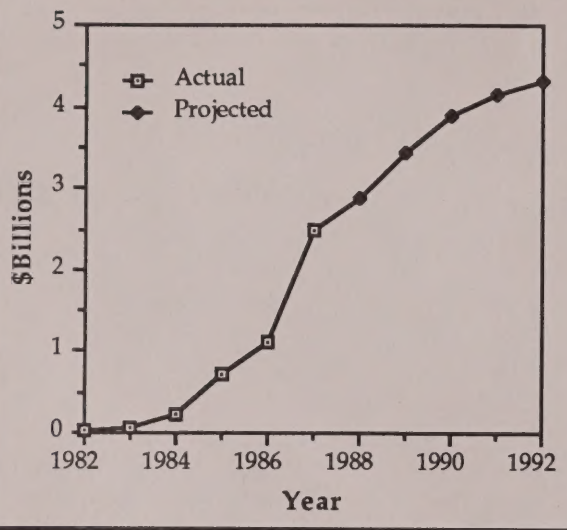
Worldwide Value of Technical Workstation Market (U.S. Vendors), 1982-1992

(Source: International Data Corporation, 1988)



desks. Nontechies in industries such as Wall Street like the speed, reliability, networking, and windowing capabilities these machines provide in conjunction with desktoplike ergonomics and pricing. Since a PC/AT bus and the ability to run PC-DOS applications are options on many technical workstations, not only are host-connected terminals being supplanted, but personal computers as well.

Likewise, the high-end is in flux. Stellar Computer (Newton, MA), and Ardent Computer (formerly Dana Computer, Sunnyvale, CA), two well-financed ventures, formally announced "superworkstations" this month. Stellar calls its product the "GS1000" (for graphics supercomputer), Ardent the "Titan" family, but they each share the same four primary goals:

- Provide equivalent floating point performance *at half the price/performance* of comparable minisupercomputers. Both companies liberally borrowed supercomputer architectural concepts to achieve this, including vector processing, disk striping, and parallelizing compilers.

- Integrate their high floating point capability with heretofore unknown 3-D graphics power. Both claim to be able to render polygons at the rate of 150,000 per second and process 400,000 3-D vectors per second. Imagine observing a computer-rendered simulation of a piston smoothly rotating in space while it "operates." Furthermore, imagine being able to analyze its patterns of heat dissipation as it strokes through a simulated cylinder. A simple example, but that's what the numbers promise.

- Supply easy-to-use interactive visualization graphics tools to remove as much as possible the control aspects of operating the machine. Stellar will license StellarVision, a home-grown set of icon-based user visualization tools based on industry standard user interfaces X Windows and PHIGS+ (Programmer's Hierarchical Interactive Graphics System) to other vendors. Similarly, Ardent is prepared to license its Doré (Dynamic Object Rendering Environment) toolkit. Both hope their toolkits may act as foundation for a future standard tool set for interactive visualization.

- Maintain consistency with technical workstation standards, such as Unix V.3/ Berkeley 4.2 and networking protocols Ethernet, TCP/IP, and the Network File System (NFS).

All this floating point and 3-D graphics performance would create heavy bus contention in typical workstations, so Stellar and Ardent incorporated tremendous internal data bandwidths for intraprocessor and processor-to-I/O communications. In the case of the GS1000, a 512-pin "DataPath" enables synchronous transfers between resources at aggregate rates in excess of 1.28 gigabytes per second.

Another common architectural feature put to use by both companies is parallel processing, and advanced software compiler technology to exploit it. Stellar licensed components of its

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compiler from Convex Computer, a minisupercomputer vendor in Richardson, Texas, and a commercial leader in compiler technology. Ardent simply hired one of Convex's compiler gurus to develop a proprietary compiler program.

Each vendor also employs innovative, proprietary technology in its machine. At the heart of Ardent's Titan is a unique vector-register file organization. Most processors are built with a fixed number of registers, each, depending on its purpose, of fixed length. Titan's vector unit possesses a concatenated register string made up of 8,192 individually addressable bits.

A sophisticated register management technique balances vector register availability and the requirement for optimum floating-point performance. Consequently, each processor can operate on vectors that can range in size from 32 registers of length 256, to 8,192 registers of length one.

One of the Stellar GS1000's most interesting features is a rendering processor which renders images as pixel maps directly into virtual memory. Conventional 3-D workstations render images into a physical frame buffer. Should the user wish to study part of the logical image that protrudes beyond the bounds of this buffer, the image must be rerendered and loaded back into the physical frame buffer, destroying the buffer's previous contents. Stellar's "virtual pixel map" concept (patent pending) enables users to scan the logical horizon of the image more quickly, as the image need not be rerendered, but simply passed from virtual to real memory.

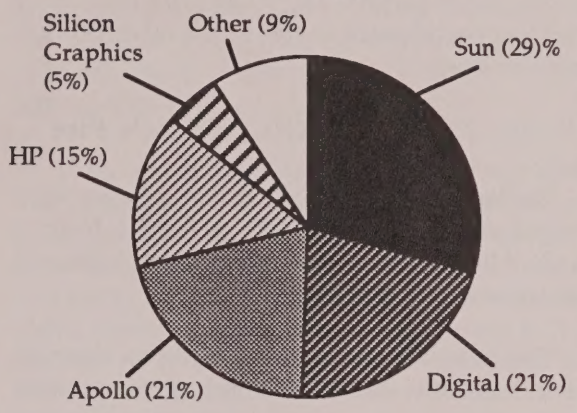
The manufacturing philosophies of the two companies also differ. The GS1000 design incorporates 61 ASICs, of which 11 are custom ASICs. Two million gates are active in the Stellar machine, 600K more than an IBM uniprocessor 3090 mainframe. Stellar believes its design tools are the key to competitive advantage and will continue to make great use of custom chips.

The Titan is built around a MIPS RISC chip and, wherever possible, employs off-the-shelf technology. Also, manufacturing of the Titan

1987 Technical Workstation Market Worldwide Figures

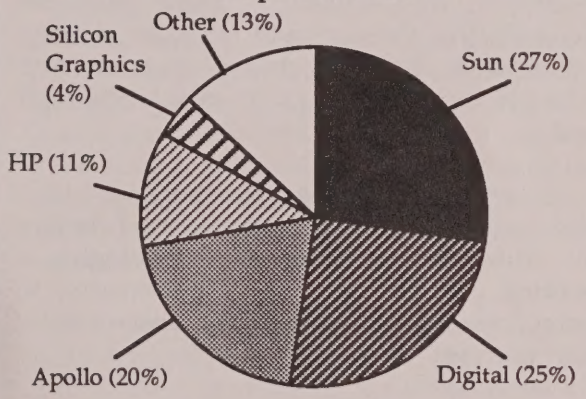
(Source: International Data Corporation, 1988)

Units Shipped



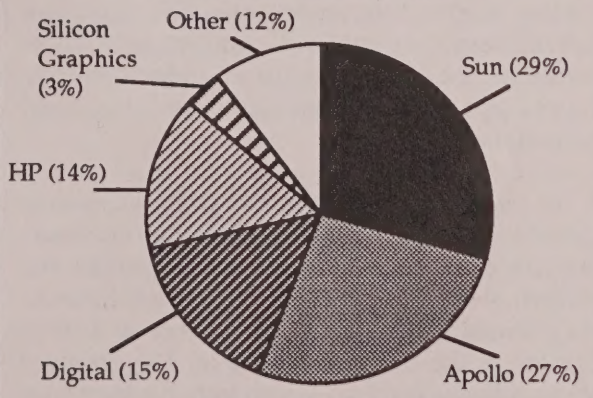
Total: 116,400 Units

Shipment Value



Total: $2,750 Million

Yearend Installations



Total: 202,500 Units

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will be handled by venture capital partner Kubota, Ltd., of Japan. Ardent seems to be staking out a low-cost position in the new superworkstation niche.

As for software, 27 independent software vendors participated in one or the other product introductions.

Where There's SPARC, There's Fire

Stellar announced that it could begin controlled shipments of GS1000 by April 1, beating Ardent by about three months. Titan shipments are scheduled to commence in July.

The power of these systems makes them effective substitutes for low-end minisupercomputers in environments where run-time sharing of logic is not critical. So effective, in fact, that the lower end of the minisupercomputer niche is threatened with extinction. Some minisuper vendors, like Convex, will strive to increase performance, distancing themselves as much as possible from the technical workstation high end.

Others are reforming their strategies to coopt the challenge. For example, last February 19, Alliant acquired Raster Technologies, a leading graphics terminal manufacturer, to help defend itself against the superworkstation startups.

As for the technical workstation market, Stellar and Ardent will not long hold a lock on the high end. Within six to eight months after Ardent begins July shipments, IDC expects a raft of reactive high-end product announcements from the older (some no older than five years) guard of the graphics and technical workstation market.

In the October time frame, look for Silicon Graphics, the high-end graphics market leader with over 7,500 of its IRIS 4D systems installed, to move abreast of Stellar and Ardent. As yet unable to compete with either Ardent or Stellar on the basis of power or 3-D graphics alone, Silicon Graphics announced, on March 14, the 4D Workgroup family aimed at delivering superior technical workgroup productivity, instead of performance at a single node. The centerpiece is the 4Server, an expandable compute and file server, capable of processing 13 MIPS and 1.5 MFLOPS.

Apollo also has a new vehicle for the high road. On March 1, Apollo introduced the company's Domain Series 10000 Personal Supercomputers. The Series 10000 is based on a new PRISM (Parallel Reduced Instruction Set Multiprocessing) architecture which, Apollo claims, will be source code and binary data compatible with its older workstation models for easy application migration, and generate up to 100 MIPS and 20 MFLOPS of processing power.

The only hitch is: you can't drive it yet. The Series 10000 will be in alpha test until June. Apollo's eager speed-demon customers must wait until the third quarter of this year at the earliest for production models to ship. Furthermore, IDC does not expect to see an equally powerful graphics subsystem for the Series 10000 sooner than the first quarter of 1989.

Apollo's haste to announce the DN10000 long before its general availability may be lamentable, but certainly is understandable. As competitively dangerous as Stellar and Ardent could be, neither approaches the threat posed by the most formidable (and most daring) force in the technical workstation market: Sun.

Last July 1987, Sun formally initiated this high-end melee when it announced the SPARC-based Sun-4/200. Relative to other so-called desktop supercomputers, the Sun-4/200's numbers are much more humble — 10 MIPS, 1.1 MFLOPS Linpack, average graphics capability. But little else about Sun is modest.

Its current SPARC offerings are uniprocessor-type, whereas the systems announced by Stellar, Ardent, and Apollo are all based on parallel multiprocessor architectures. Sun is believed to be working on an implementation of SPARC that will support multiprocessing and Ardent/Stellar-quality graphics. IDC's Technical Computing Program expects a late 1988 introduction of this system.

The performance of SPARC-based systems,

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however, will be greatly improved over the next few years independent of multiprocessing. Sun currently is building workstations around 1.5 micron CMOS SPARC chips purchased from SPARC-licensee Fujitsu Microelectronics. Cypress Semiconductor is developing a 0.8 micron CMOS version that it claims will run around 20 MIPS. An emitter-coupled logic version of SPARC that may operate at 40 MIPS is being worked on by Bipolar Integrated Technology (BIT). Both Cypress and BIT target the fourth quarter of 1988 as likely ship dates. Ultimately the SPARC design could generate 100 MIPS when implemented in more advanced chip substrates like gallium arsenide.

In the meantime, the power Sun draws from its Open Systems strategy increases unabated.

Open Systems Competition

The technical workstation niche was created and nurtured by Apollo's stunningly successful execution of a competitive strategy based on a proprietary network operating system concept. Other technical workstation vendors followed suit.

Sun, however, defied conventional wisdom by using standard hardware and software elements, like the Motorola 68000 processor and Berkeley 4.2 Unix, to seize the low-cost position in the technical workstation niche. The company has since remained true to its origins by making available to the market internally developed advances in hardware and software technology. For instance, Sun developed, and subsequently published, such widely known system interfaces as Network File System (NFS) and Network-extensible Window System (NeWS). SPARC is perhaps the most recent example of Sun's open systems commitment in action.

The technical workstation market, in general, has come to embrace the open systems concept. A Unix derivative operating system was delivered with the vast majority — over 85% — of the technical workstations shipped in 1987.

Only Digital has been able expand its workstation business while predominantly offering a proprietary operating environment (MicroVMS). Its low-end pricing has been very aggressive. Until recently, DEC offered the lowest-priced workstation available, a diskless, monochrome VAXstation 2000 for $4,600. Digital's warlike market stance was rewarded with a 21.5% share of total 1987 technical workstation shipments.

IBM, on the other hand, has been unsuccessful in the technical workstation market selling a machine that conforms to an open systems approach. The company's RT PC (for RISC Technology PC), when released in January, 1986, offered leading-edge RISC technology and a Unix derivative operating system (AIX), but not the market-ready peripheral power — disk, RAM, high-resolution graphics, and networking — to be a hit among technical professionals.

Today, much more technologically solid and powerful, the RT PC still has major drawbacks: no momentum and an association with IBM, which is generally avoided by the technical community. As 80386-based products become more readily accepted platforms for technical computing, however, it is likely that PS/2 Model 80s and their progeny will find their way onto many technical desks.

But, wary of cannibalizing midrange systems sales, it appears that both IBM and DEC will confine their workstation activities to the low end of the market.

If the computer industry's two giants are hesitant to introduce conflict to their product lines, Sun, Apollo, et al. will gladly do it for them. Two corporate idiosyncrasies seem to dominate technical workstation vendors:

- A thirst for innovation, or conversely, a morbid fear of obsolescence.
- An unshakable belief that the advantage is won by attacking.

For technical workstation vendors, this means regularly introducing new products based on new technologies, and aggressively pursuing

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new markets.

Once again, Sun is leading the charge. As the recent cacophony concerning Sun's dealings with AT&T attest, most are uncertain of Sun's "open systems" intentions (see the ***Gray Sheet***, Vol. 23, No. 18, January 19, 1988). The reasons for the unrest are varied, but one thing is certain: Should the alliance lead to a Unix V.4 far more appropriate — in such terms as transaction processing , security, etc. — for building commercial information systems based on networked workstations, Sun, and Apollo for that matter, will almost stop at nothing to provide the boxes.

The superworkstation market shares this competitive instinct. Advances in chip technology should allow Stellar to improve by a factor of two the price/performance of its high-end line in each of the next two years. Using their proprietary design tools with which they can simulate computer designs on a network of workstations (Stellar will not be accused of "throwing it over the wall"), development costs could be cut enough to offer a 20-25 MIPS, 40 peak MFLOPS, 600,000 3-D vectors/second computer *for roughly $50,000*. Rest assured that at this price the commercial computer market will find a way to exploit power of this magnitude.

Armed with the hottest products around and supported by corporate cultures that feed on innovation, workstation vendors, no longer labeled technical, will roam the industry's terrain, taking huge bites out of any technology that sits still too long. Bill Poduska, cofounder of Prime, founder of Apollo, and now mentor of Stellar says his company will either be a $500 million concern in five years — or a nonexistent, zero dollar company. Similarly, Scott McNealy, Sun's young CEO, was quoted in the 8/17/87 issue of *Fortune* as as saying: "When two wheels are off the cliff, we start getting careful. With one wheel off, we just step on the gas." For Stellar, Sun, and their workstation compatriots/competitors, there doesn't seem to be any in-between.

Department of Definitions:
Contrasts of Single-User System Types
(Source: International Data Corporation, 1988)

		Type of Single-User System	
		Personal Computer	**Workstation**
Basic Features	Primary OS	DOS, OS/2, Mac OS	Unix, VMS, Aegis
	Distribution	Primarily retail	VAR, OEM, direct
	Market focus	Commercial	Technical
Current Product Characteristics	Primary application	Text	Graphics
	Uniprocessor integer perf. (MIPS)	5.0 maximum	40 maximum
	Typical resolution	480 x 640	1,024 x 1,024
	Graphics capability	2-D only	3-D option

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Department of Definitions (cont.)

IDC's desire to deliver accurate and meaningful data requires occasional refinement of key processor-class definitions. The rapid pace of change in the workstation market requires such a restatement.

Technical workstations are distinguished from personal computers by primary operating systems, hardware capabilities, market focus, and distribution channels.

The market focus is of particular importance: workstations are sold into environments where the vendor emphasis is primarily technical applications, as opposed to commercial applications. For example, the majority of Digital's VAXstations are still sold for technical applications, even though roughly 30% are used for commercial applications. The workstation figures herein accordingly include commercial VAXstation shipments. On the other hand, while Macintoshes with AUX will be counted in the future, regular Macs have not been and will not be.

Even As We Speak: Sun's 386i Workstation

Properly demarcating the workstation/PC boundary is important precisely because technical workstation and desktop personal computer technologies are highly substitutable. Indeed, Sun's new 386i workstation appears to be positioned opposite products from Apple, Compaq, and IBM, in addition to traditionally technical competitors.

The name 386i reflects Sun's attempts to integrate the best of both technical workstation and commercial desktop technology.

The result is impressive. The 386i blends DOS compatibility, an easy-to-use graphical user interface, and powerful Unix-based workstation capabilities. And, partially owing to the fact that the 386i does not require DOS coprocessor boards, a price that falls within the high-end commercial desktop range.

The machine's personal computer look derives from a number of innovative features:

- Sun has managed to effectively hide Unix, the scourge of many multitasking desktops, from the user. System resources can be accessed through a graphical windowing system, replete with icons and menus, instead of the arcane textual commands that characterize Unix.

- Bundled within the system is a sophisticated hypertext library of help and documentation files that can be extended by third parties. The context-sensitive online facility allows users to flip through information about the user interface and system management tools. Sun's goal is to reduce the need for specialized printed documentation, training, and support personnel.

- Multiple and simultaneous DOS sessions can be run in windows created and managed on the 386i by SunOS 4.0, which merges Unix V.3 and Berkeley 4.2/4.3. Moreover, a DOS application can run under Microsoft Windows in a SunOS window if the user is so inspired. Data can be cut-and-pasted from DOS to Unix applications, or vice versa, without rebooting one or the other operating systems.

- To support DOS applications written to the Lotus-Intel-Microsoft Enhanced Memory Specification (LIM EMS), all 386i DOS Windows share up to 2MB of LIM EMS RAM.

- Although most system work (i.e., virtual paging, screen updates) is done over a proprietary 32-bit system bus which runs at processor speed, favorite expansion boards can be plugged into any one of four expansion slots. An IBM AT expansion bus reconciles differences in bus speeds within the system.

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The machine is a fine, albeit expensive, platform for spreadsheet, word processing, and other types of work commonly associated with personal computers.

But this personal computer is not built solely for personal computing. In certain situations the 386i will be competitive at the high end of the 80386 market with the IBM PS/2 Model 80 and the Compaq Deskpro 386/20. But a primary purpose could be to act as a diskless workstation in a server environment. The 386i could play a major role for Sun in cost-effective downsizing of traditional minicomputer applications to a network of microcomputer-based nodes.

Sun will license a new software protocol called NETdisk that describes how a server could provide virtual memory services to a diskless node over Ethernet. NETdisk is how Sun is able to run an operating system, SunOS 4.0, requiring 35MB of memory on a diskless workstation with no more than 16MB of RAM on board.

When a diskless 386i is powered up, a 4MB portion of the operating system is downloaded from the server. Thereafter, operating system services not resident at the node are made available over Ethernet. All real memory processing, that is to say work done on data residing in physical memory locations, is handled at the node. Virtual, demand paging memory operations are provided over Ethernet by the server.

The problem with this architecture is Ethernet consumption. At 10MBps capability, a lot of I/O activity by a large number of users would lead to very slow network system. The diskless workstation/server environment is therefore best suited for applications that are less I/O intensive, like CASE, CAD/CAM, CIM and electronic publishing activity. For applications with volumes of code that require large memory spaces, the likelihood of page faults increases, and the application's performance would suffer.

But in fact the CASE, CAD/CAM, CIM, and electronic publishing markets are three of Sun's largest. IDC estimates that when shipments of the 386i begin in June, 2,000 of them could be shipped per month; as many as 80% could be diskless. Next year, upwards of 5,000 units could be shipped per month. The volume will be sold directly, through OEMs, and via the Sun VAR Program. These channels will stress network system sales, not individual unit sales.

Thus, while at first glance the 386i looks like a PC, a second glance at its powerful network capabilities, combined with ease-of-use, DOS compatibility, and low price makes it look more like a very attractive downsized minicomputer.

Digital Turns Its Attention To Bigger Things

A new assault on the high end commercial processing market is under way in Maynard. Digital is marshaling its technical forces to deliver customers superior supermini, even mainframe, performance and on-line transaction processing (OLTP). And if, in the process, it can supplant a few of IBM's low-end 3090s . . . Well, that's OK too.

The moves are coming in response to increasing softness in DEC's supermini business. A close look at Digital's nearly 17% share of the 1987 U.S. midrange systems market reveals its success on the one hand, and its dilemma on the other.

For Digital's small-scale product line (MicroVAX II, VAXStation 2000), not its medium-scale systems (11/7XXs or 8XXXs), has gilded the house that Ken built. The past three years have seen DEC's total VAX MIPS installed in the U.S. grow over 80% CAGR. During this time, however, the distribution of VAX MIPS has swung dramatically from the predominantly medium-scale 11/7XXs and 8XXXs to small-scale MicroVax IIs and VAXStation 2000s.

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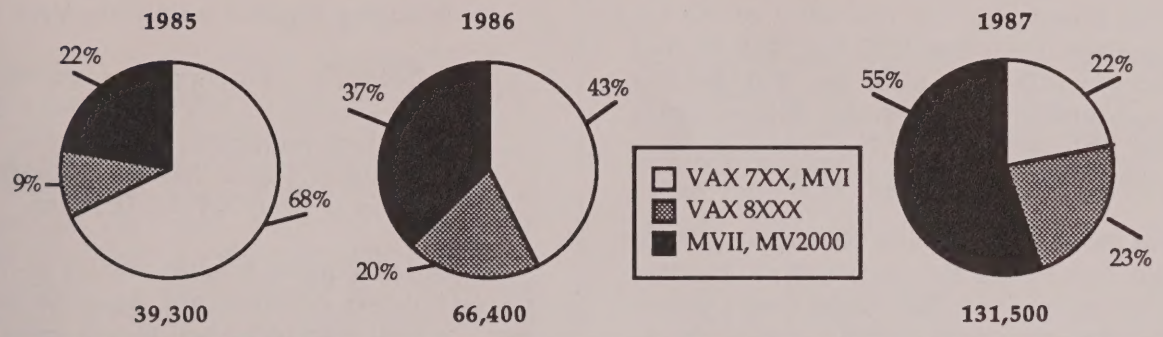
VAX MIPS (11/780 Equivalent) Installed in the U.S., 1985-1987

(Source: International Data Corporation, 1988)



IDC expects a series of VAX 8XXX announcements from DEC in the next 18-24 months. The first arrived March 8, when the company unveiled Polar Star, the DEC internal code name for five new VAX 8800 processors.

All five are based on the more-than-two-year-old technology found in the VAX 8700. Indeed, the uniprocessor base model 8810 is, as a DEC executive put it, a "nomenclature upgrade" for the older box. The 8810 offers the same performance, 6.5 VAX MIPS, for the same price, and under the same terms and conditions of the 8700.

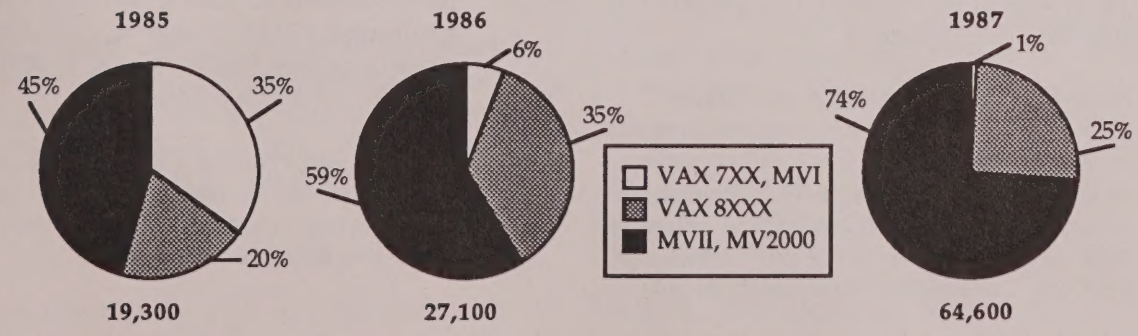
The characteristic distinguishing the new 8800s from previous VAX offerings is not, however, to be found in hardware, but in the machines' software. Symmetric Multiprocessing (SMP) is a collection of new VAX/VMS system software functions that redefine the resource locking mechanisms within the VAX/VMS kernal so that, for instance, each processor within a multiprocessor configuration could execute synchronous I/O. In effect, SMP obsoletes the master/slave hierarchy that ruled over previous multiprocessor VAXes.

Taking advantage of SMP will be four new multiprocessing VAX 8800s. The two-processor VAX 8820 is field upgradable, through the three-processor VAX 8830, to the four-way VAX 8840. With SMP, the 8840 will deliver a peak of 24 VAX MIPS, roughly 3.7 times the performance of the 8810. Finally, the hybrid 8842 is two tightly-coupled 8820s strapped into the same cabinet to provide a fault-tolerant platform.

DEC is not the first traditional supermini vendor to offer symmetric multiprocessing — Gould, Prime, DG, and IBM all offer symmetric multiprocessing on two-processor superminis. DEC can claim to be the first supermini vendor

VAX MIPS (11/780 Equivalent) Shipped in the U.S., 1985-1987

(Source: International Data Corporation, 1988)



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to offer more than two-way symmetric multiprocessing in the supermini class.

And therein lies the real news of the announcement. Not that DEC has SMP on four processors within the same box, but that this was a *supermini* announcement. The real news is that DEC doesn't have *It*, where *It* is high-end commercial processing, just yet.

For months, Digital has been leaking information about Polar Star to customers, analysts, and the press. Polar Star would finally deliver mainframe performance from a VAX architecture suitable for high-end general commercial processing and on-line transaction processing (OLTP).

At the announcement, however, Polar Star was portrayed as a promise of high-end things to come. Instead of being the new generation of high-end VAXs, the 8800s would play point to a series of announcements that would culminate in a true VAX mainframe by mid-1989. Polar Star itself was positioned as a supermini, not a mainframe, announcement.

And so it is. DEC's VP of *midrange* systems, not his high-performance systems counterpart , partook in the introduction. The story heard was of a new 8800 family *complementing*, not replacing, mainframes. The machine is being marketed to sway *existing* Digital customers considering an expansion of mainframe MIPS, not as a platform for cracking new glass house business. The 8842 provides *fault-tolerance*, without full-blown OLTP. Finally, the 8800 is for technical users who might otherwise have done something drastic, like purchase a competitive minisupercomputer.

The turnabout on the 8800s was presumably dictated by three things:

- Polar Star will not deliver mainframe throughput. SMP will improve performance in compute-intensive environments, but in mixed-mode environments characteristic of general commercial processing the four-way 8840 delivers only *twice* the performance of an 8700 — at roughly *three times* the cost.

- Maynard apparently feels it must be more careful positioning 1988 product announcements, because the market literally has not been buying Digital's mainframe-VAX line.

- VMS/SMP is a "fully supported pre-release of" long-awaited VAX/VMS 5.0, but *it is not 5.0*. Much yet remains to be accomplished before Digital has the software technology to offer "hot" OLTP boxes.

Three subsequent announcements — code named Calypso, Argonaut, and Aquarius — will over the next year-and-a-half to two years address Digital's processing requirements above its successful supermicro lines. Specifically, look for DEC to introduce the following:

- A low-end midrange, 1-4 processor, SMP-capable VAX 6XXX, built with CMOS technology to deliver a peak of roughly 16 VAX MIPS. Another way of looking at these machines is as a combination of multiprocessing MicroVAX 3XXXs and the VAXBI bus architecture.

- VAX/VMS 5.0, that may include new and improved system software functions to finally provide OLTP. Expect improvements to VMS's and DECNet's resource interlock resolution, security, rollback, and recovery functions to enhance the VAX's cross-system data integrity capabilities. Also, inter-device input/output control functions, like browsing, spooling and destination control, may receive attention. These improvements may come in the form of a new release of Rdb, DEC's relational DBMS, and a teleprocessing monitorlike program.

- Progressively more powerful uniprocessors. By this time next year, a 10-12 VAX MIPS uniprocessor VAX should be available. Two years from now Digital should be shipping a 20-22 VAX MIPS uniprocessor.

Don't be surprised if DEC, to deliver this power, uses poetic license to remain true to its "one architecture" message. Tomorrow's VAXs may look less and less like today's.

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The Me Generation Returns to Cupertino: Apple Sues Hewlett-Packard and Microsoft

Has it really been six years since the "Us" Festival? Apple cofounder Steve Wozniak's good-natured attempt to celebrate the cooperative successes of the yuppie generation, especially in the high-tech industry, is but a faint memory in Cupertino, CA, today. Apple has undertaken a legal campaign to stymie the efforts of fellow Cupertinite Hewlett-Packard and heretofore soulmate Microsoft to propagate graphical interfaces in the IBM and compatible personal computer world.

The three-count complaint charges both Hewlett-Packard and Microsoft with infringing on Apple's intellectual property rights to the Macintosh user interface. The central issues in the suit seem to be two:

- In the process of developing New Wave, did Hewlett-Packard illegally appropriate the "look-and-feel" of the Macintosh user interface?

- Does Microsoft's Windows 2.3 program incorporate Finder characteristics not covered by a 1985 agreement signed by Chairman Bill Gates, and Apple's President and CEO John Sculley?

In the agreement, which until recently remained confidential, Apple granted Microsoft "a nonexclusive, worldwide, royalty-free, perpetual, nontransferable license to use [the Finderlike features of Windows 1.0] in present and future software programs and to license them to and through third parties for use in their software programs."

Apple insists Microsoft exceeded the bounds set by this agreement. And Hewlett-Packard, Apple alleges, constructed New Wave upon a Windows 2.3 foundation only after Apple refused it licensed access to the Mac interface.

Not a WYSIWYG Affair

Four views of the suit have emerged from the *Gray Sheet's* discussions with IDC analysts and others in the industry: the lawyers-will-be-lawyers view, the narrow competitive-positioning view, the broad competitive-positioning view, and the industrywide conspiracy view.

The lawyers-will-be-lawyers view regards the suit as a simple programmed response on the part of Apple to a highly complex competitive situation. Apple has a threshold for legal retaliation, this view would maintain, developed and nurtured by the Franklin Computer (Apple II clone) and Digital Research Incorporated (Graphics Environment Manager — GEM) actions, that both Hewlett-Packard and Microsoft have crossed.

The narrow competitive-positioning view is based on a belief that Apple's suit is a targeted action to defend the Mac Plus and Mac SE from potential price competition. As currently positioned, the $2-4K Mac Plus and Mac SE seem cheap in comparison to the $5-12K 80286/386 and OS/2 with Presentation Manager (OS/2 1.1) environment. Likewise, HP's New Wave and Microsoft's as-yet-unreleased DOS 3.4 (which may incorporate some Windows characteristics) environments are less expensive by comparison, and might pose a price/cost threat to Apple.

The broad competitive-positioning view has Apple attacking, albeit by circuitous means, IBM. Should the outcome of the suit find that Windows 2.3 violates Apple's copyright on Mac Finder, Presentation Manager, which will be based on Windows 2.3, and ultimately IBM's System Application Architecture (SAA) would be in jeopardy.

But since a court decision is quite some time off, the immediate goal of the suit could be to *obviate software development for OS/2 and Presentation Manager* by the independent software vendor (ISV) community. Without applications, IBM's strategic workstation environ-

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ment, still waiting to be launched, could rot in its berth. Software developers contacted by the *Gray Sheet* are indeed disturbed by the suit, and uncertain of its ramifications.

The industrywide conspiracy view is based on a belief that Apple is being ambushed by a carefully orchestrated Microsoft + HP + IBM + who-knows-who-else collective effort. In this scenario Microsoft *has* been ignoring the 1985 agreement in the belief that Apple's copyright will be blown out in court, or at least so narrowly interpreted that Microsoft will be free to act as it pleases. Microsoft et al., this view would maintain, are forcing Apple to unwittingly play the aggressor, and imbibe the negative PR, to meet the ends of the IBM-compatible world.

And the confrontation will likely abound with bad PR and vituperations. Already Apple has struck the first low blow. It circulated pictures among the press comparing a Mac screen to a New Wave screen, without mentioning that certain of New Wave's icons had been rearranged, moved from default positions, to look more like a Mac.

Of course, these views are not mutually exclusive. Indeed, the *Gray Sheet's* perspective is a combination of all four. Perhaps Apple would like to defend its underbelly, but is uncertain of its chances in court. It is important to note that Apple did not file for an injunction to halt New Wave shipments. Obtaining an injunction would require Apple to prove to the court that it had a reasonable chance of winning the case.

Does Apple not think it could win? Or is it just stirring up confusion (broad-competitive)? Is the ultimate target Presentation Manager? Or is Apple just demanding some hard, up-front bargaining from HP and Microsoft (narrow-competitive)? And is it delivering this demand by the same messenger, the courts, as it used to confront DRI (lawyers-will-be-lawyers)?

Apple may just be uncertain of both HP's and Microsoft's competitive intentions. The lawsuit could be an attempt by Apple to learn, and ultimately influence, what it's up against. However heavy handed its actions may seem, remember that it has worked before. Apple may be just trying to:

- Defend its current strategic position by exacting concessions from both adversaries.

- Manage future risk by negotiating the scope of HP's and Microsoft's future competitive intentions

If this perspective is correct, Apple would be apt to eventually settle out of court, just as it did in the DRI confrontation.

But DRI weren't no Microsoft; and it weren't no HP; and it weren't no IBM. DRI was a company in trouble. It didn't possess the resources to undertake a protracted defense. Moreover, GEM was a bet-the-company product. A long shipment delay could have cost DRI its OEM channel. That could have cost DRI everything.

HP and Microsoft are Apple's equals. Rarely does such a thing as a little lawsuit among friendly equals remain friendly. Neither HP's nor Microsoft's cooperation is assured.

HP has told the *Gray Sheet* that if Apple just wants a few icons replaced, they will gladly comply. HP suspects, however, that Apple's legal antics indicate an agenda that isn't limited to trash cans, and is committed to fight serious change to New Wave.

Regardless of who spun it or how Apple got to it, John Sculley and company have stepped onto a very thin thread, one akin to spider's silk. And where there's spider's silk, there's spider's web.

Other vendors, such as Sun, and users alike are cringing at the idea that Apple owns pull-down menus, or pop-up windows, or icons. To them, Apple, as a result of its action, may begin to look less like an innovator, and more like a pest — a juicy fruit fly, if you will. Its predicament may not be of conspiratorial making, but Apple may eventually find itself in a very sticky situation.

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"MVS/XB," By Any Other Name

There they go again. Thrice in the last six-and-one-half years IBM has wrapped itself in new organizational threads and set out to rollick anew in the information management market. On each occasion, the giant's first stop has been the house of large systems.

In late October of 1981, less than one month after folding all sales and marketing of IBM products into a single Information Systems Group, IBM announced Extended Architecture (XA). The 12 February 1985 Sierra introduction likewise followed a restructuring by a month.

It seems, in retrospect, that the more far-reaching the restructuring, the more seminal the ensuing large-systems announcement. Both October 1981 actions fostered significant advantages for IBM. Both 1985 announcements, on the other hand, proved less than historical in their effects. The 1988 announcements are more similar to their 1981 predecessors.

This winter's major restructuring heralds a major offensive by IBM against corporate stasis (see the Vol. 23, No.20 issue of the *Gray Sheet*). And the inaugural product and program announcement from IBM's new Enterprise Systems Group may be IBM's most critical large-systems move since the introduction of the S/360 almost 23 years ago. While it represents a less dramatic change in underlying architecture than XA did, it comes at a time when PCM and downsized substitutes to IBM's mainframes have never been more viable, and are growing in popularity.

The heart of the announcement is a new high-end S/370 operating environment, called MVS/ESA or Enterprise System Architecture. Also announced were an integrated combination of hardware and software tools for logically partitioning 3090 processor complexes, four new processor models (the 3090 E models 280E and 500E and 4381 models 91E and 92E) and some new, market-wise 3090 upgrade paths.

IBM's largest S/370 customers are the primary beneficiaries. MVS/ESA offers some novel and reasonable paths for expanding host-based application and database management systems.

The PCMs face the biggest challenges. The inclusion of the 3090 E models in the ESA realm may begin altering large-system hardware procurement decisions in IBM shops immediately. However, customers won't begin making serious migration decisions until early 1989 – awhile after the foundation pieces of MVS/ESA have been delivered, and the 3090 "F-Series" has been announced.

The Plan Doesn't Call for Evacuation

Since its 1981 introduction, XA has been IBM's favored operating system for interactive processing in a large systems environment. The company made few technological leaps after introducing XA because it didn't want to alienate high-end S/370 customers with one extensive system and software migration after another. Within the XA framework, Amdahl, NAS, et al. have been able to provide attractive price/performance alternatives to IBM's mainframes by swiftly reacting to Big Blue's incremental hardware enhancements.

But as applications have become more complex and the number of online users of the computer system has increased, mainframe customers have begun to view XA as a constraint making information system planning increasingly more difficult.

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Relational databases, fourth-generation languages, and future applications integrating voice and data and "AI" techniques are all contributing to the planning problem. For instance, IBM has noted that five years ago the typical CICS transaction required between 12 to 14 discrete input/output (I/O) operations. Today CICS transactions typically require 40 to 50 I/Os. System performance suffers accordingly.

Moreover, again according to IBM, a standard 3000-character letter would require 70,000 bytes of storage to be stored as an image. The addressable memory limitation of XA allows for barely 28,000 stored objects of this size. If image is the future, XA would relegate IBM mainframes to the role of the world's most sophisticated, and expensive, file cabinets.

ESA's most important characteristic is that while it once again greatly differentiates IBM's high-end S/370 processors and storage peripherals from the PCMs, and offers users relief from the constraints of XA, *it appears to do so without creating a situation requiring another massive user migration.*

Acronyms Behind the Acronym

IBM's claim is that for those customers with the most current version of MVS/XA, the migration to the ESA version of MVS will be no more difficult than a trek within MVS versions, from release to release.

The keys to simplifying the migration process are the two current components of ESA – MVS/System Product Version 3 (MVS/SP 3) and MVS/Data Facility Product (MVS/DFP 3) – which dramatically alter data storage management within the computer, without equally upsetting the logical view of data and resources held by users and applications.

MVS/SP 3 and MVS/DFP 3 provide for new services to administer control over the storage management hierarchy, and new techniques for separating data from program and system logic:

- ESA unleashes Expanded Storage. System Administrators can now define how they want this powerful resource to be utilized.

- Often accessed pages of data can now be permanently located in expanded storage in high-performance storage spaces. Pages located in "hiperspaces" will not be subject to normal storage resource contention and paging activity, but will instead be available to the processor at semiconductor speeds. Within ESA is the capability to address multiple hiperspaces of up to 2GB each as a logically single data object.

- The technical limitation on virtual addressing has been vastly increased by ESA to a maximum 16 terabytes, or 8,000 times the current 2GB XA limit.

- The Data Facility Storage Management Subsystem (DFSMS) of ESA, comprised of the MVS/DFP 3 family of data facility products and RACF, simplifies the management and use of external storage resources such as tape and disk drives.

- Customers can demarcate data-only areas in virtual memory. These "data spaces" effectively relieve the virtual addressing constraints hitherto placed on application program size by allowing customers to remove data and program libraries from a program's address space. Data spaces, and brethren address spaces, can be as large as 2GB.

These services will be accessed through high-level language interfaces, freeing application programmers from the drudgery of coding storage instructions directly into applications. As a result, programmer productivity should increase dramatically, making system-managed, administrator-controlled storage not only technically feasible, but cost-effective as well.

Further attractive costs could be realized if, as promised, ESA can reduce the number of I/Os per transaction by 30-40%. For systems running applications accessing multiple smaller data sets or a few very large data sets, the I/O improvement could translate into significant per-

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OTHER 2/15/88 DETAILS

Some less important, but still nifty, competitive moves included:

- Processor Resource Storage Manager (PR/SM, pronounced "prism") will allow users to logically partition a single processor complex into four separate machines. Physically partitionable systems, like the 3090-300E, 400E, 600E, and the new 280E, can be logically partitioned into eight machines. PR/SM is a direct response to Amdahl's Multiple Domain Facility (MDF), creating a situation whereby IBM is acting like a PCM to a PCM.

- Two new 3090 E models were introduced, the 280E and the 500E. The 280E is equivalent to a 200E except that it can be physically partitioned into two 180Es to support smaller workloads. The 500E is physically partitionable into separate 200E and 300E complexes and produces 1.5 times the performance of a 300E in single-image mode.

- The 3090 E family now offers a set of more flexible upgrade paths. Previously the only upgrade available to 300E users was the existential leap to the 600E. The 500E makes the 300E much more attractive to the market by providing a more gradual route.

- Two new air-cooled 4381s, the models 91E and 92E, offer performance levels identical to, respectively, the 4381-23 and 4381-24, while at the same time providing an expanded storage "capability." *Neither the 4381-91E nor 4381-92E offer physical expanded storage.* Not unlike the Amdahl or NAS solution, 4381 91E and 92E users will be able to stake out either a 16MB or 32MB section of real memory to act like expanded storage. For this reason it is likely they will be most popular among users wanting to test drive ESA or do application development in the new environment.

formance improvements. More and larger data sets would then be economically possible.

Taking advantage of ESA will require at least an E model of the 3090 or 4381 (the new 91E and 92E) processor families. Base 3090s and older 4381s will *not* be participating.

In This Corner, Expanded Storage

IBM's large systems competitive strategy revolves around its unique offering of physical expanded storage. Currently, IBM offers room for up to 2GB of expanded storage in its largest 3090 E models, all of it beyond human intervention, controlled entirely by the processor. Thus, in the XA demand paging scheme, expanded storage is temporary lodging for data sets while they wait to be shuttled off to work in main memory or to idle on disk.

With ESA, however, systems administrators are given tools to define the operation of expanded storage. If users want, their existing data volumes (which are, after all, less than 2GB) could be located in hiperspaces in expanded storage, so that the processor need only go to disk for archival purposes.

To concurrently exploit ESA's larger addressable memory and more flexible storage hierarchy, IDC believes that the follow-on to the 3090 E models (the 3090 F-Series) is likely to include, among other things, considerably more room for expanded storage.

Using this expanded storage will be program products that require more virtual memory and greater data access speeds to execute efficiently. Some of them are currently so much hiperspace hype – like image processing and AI. Others, however, are often mentioned as "missing requirements" and could generate significant productivity gains in critical areas of mainframe operation today – like the DB2 "Repository."

ESA creates two problems for PCMs, who

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haven't forgotten their tribulations during the XA transition.

First, processors from NAS and Amdahl provide the ability to partition real memory, at initial microcode load, into a real memory area and an expanded storage*like* area. In a sense, they simulate the expanded storage function. But it will be difficult for the PCMs to simply mimic the new role of expanded storage in real memory. Every byte of pseudo-expanded storage means one less byte of real memory available to the processor for executing instructions.

Configuring a PCM processor complex for efficient operations may be a far more complex, and costly, process in the ESA world than it had been in the XA world. On this issue, NAS, which offers 2GB real memory to carve up, is in better shape than is Amdahl, which offers only 512MB of real memory.

Bear in mind, however that Amdahl has a special relationship with Fujitsu, which last summer gained access to some of IBM's operating system interfaces, not just specifications. It will be interesting to see whether or not IBM is ultimately forced to share MVS/ESA interfaces with Fujitsu, and, if so, whether or not Fujitsu will ultimately share these with Amdahl.

The second problem is that real memory is a much more expensive resource for vendors to produce, and customers to procure, than expanded storage. By promoting expanded storage, Big Blue may have created a significant cost advantage for itself, one that could grow rapidly thanks to Armonk's leadership in 4Mb DRAM chip production.

Thus, although the PCMs have announced their intention to support MVS/ESA, it may be a long time before they are able to *exploit* it.

Of course, the PCMs would have nothing to fear if users turn thumbs down on ESA, but this doesn't appear likely. ESA is IBM at its best. It may not spur a new feeding frenzy for mainframe MIPS and generate a sharp rise in the absolute level of mainframe shipment revenues, but it should set the parameters for mainframe computing for the next decade.

Money Matters

"As IBM goes, so goes the computer industry" used to be a rule of thumb for financial analysts. It certainly worked out in the aggregate, since IBM's numbers are so elephantine that they dominate any sample of industry vendors in which they're included.

No less a sample than the *Gray Sheet's* list of companies seems at first blush to be dragged down by Big Blue's weaknesses. For 1987, the sample grew 11.2% in revenue, while the systems vendor segment was up 10.1%. Without IBM, though, the figures would have been 17% and 14%, respectively.

There's a hitch to this logic, however, since many of the hot companies in the industry were taking market share from IBM (e.g., Amdahl, Digital, Compaq, and Apple). Others were exploiting niches or markets where IBM, and often almost everyone else, are still deficient (to wit, Sun, Tandem, Cray, et al.).

In another sense, IBM's 5.8% growth for 1987 does indeed set an example for the industry – at least for other old-line full-line vendors.

Unisys, after a year of apples-to-oranges financial comparisons (see the *Gray Sheet*, Vol. 23, No. 13, Dec. 4, 1987), has released pro forma comparisons to what it would have done in 1986. For consistency's sake our Unisys+Sperry result is still included, but the 6.7% pro forma growth figure is the true measure.

Honeywell Bull has also returned pro forma. It has released a figure of $2.06 billion in revenue for calendar 1987, an 8% growth over the $1.9 billion figure for the last year of HIS. No earnings figures were released, although the company did say profits were up.

A final note: this list lacks MSA and Tandon because their results were not received by press time.

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Selected Information Industry Financial Results, Fourth Quarter 1987

(Source: Company Financial Reports)

Category/ Company	4Q/87 Rev. ($M)	4Q/86 Rev. ($M)	% Change	4Q/87 Earn. ($M)	4Q/86 Earn. ($M)	% Change
Computer Systems						
Alliant*	14.2	12.3	16.1%	1.9	2.1	(10.0%)
Altos*	46.7	40.4	15.6%	6.3	2.5	152%
Amdahl	482.9	336.8	43.4%	53.0	29.6	79.1%
Apollo	163.0	120.9	34.8%	10.5	5.3	99.4%
Apple	1,042.4	662.3	57.4%	121.4	58.5	107.6%
Compaq	432.1	186.9	131.2%	49.0	16.2	201.8%
Computer Consoles*	39.2	41.3	(5.0%)	9.0	.05	1719.8%
Control Data*	927.5	903.6	2.6%	10.8	(226.2)	NA
Convergent Tech	100.4	77.4	29.7%	(23.9)	(4.5)	NA
Convex*	20.2	12.9	56.1%	2.3	1.4	65.3%
Cray	163.6	138.2	18.4%	34.1	23.3	46.1%
Data General	342.9	313.3	9.4%	12.4	3.3	275.8
Digital	2,782.3	2,272.8	22.4%	329.5	270.0	22.1%
Gould*	242.9	227.4	6.8%	(106.4)	4.6	NA
Harris	501.4	533.8	(6.1%)	24.2	20.1	20.1%
Hewlett Packard*	2192.0	1740.0	26.0%	179.0	116.0	54.3%
IBM	18,011.0	16,945.0	6.3%	2,087.0	1,390.0	50.1%
Kaypro	22.5	30.0	(25.0%)	(0.6)	1.3	NA
MAI Basic Four	85.2	72.0	18.4%	5.6	4.6	22.1%
MASSCOMP	19.0	17.2	10.3%	0.9	1.1	(12.7%)
NBI	61.8	69.8	(11.5%)	(13.3)	(3.9)	NA
NCR	1820.1	1575.1	15.6%	161.4	134.1	20.4%
Prime	267.0	230.9	15.6%	21.3	14.2	50.5%
Pyramid	17.5	12.0	45.5%	1.8	(0.4)	NA
Silicon Graphics	35.5	18.4	93.2%	2.7	2.3	19.5%
Sperry*	NA	NA	NA	NA	NA	NA
Stratus	55.2	35.4	56.0%	6.5	3.7	77.0%
Sun Microsystems	235.1	116.5	101.8%	14.0	8.5	64.1%
Tandem	282.3	240.2	17.5%	23.7	27.1	(12.5%)
Tandy	1,302.9	1,196.0	8.9%	130.8	103.8	26.0%
Unisys*	2,798.9	2,535.8	10.4%	216.9	(188.5)	NA
Wang	784.7	668.9	17.3%	34.1	(78.6)	NA
Subtotal	35,292.3	31,383.4	12.5%	3,405.9	1,741.9	95.5%

**Alliant 4Q1987 income includes $1.6M in extraordinary credits; Altos 4Q1987 income includes $3.1M from selling part of Informix stake; CCI 4Q1987 income includes $1.7M extraordinary gain; CDC 4Q1987 income after $21.5M charge, $6.7M extraordinary loss, and $90.8M gain from sale of remaining interest in Commercial Credit Corp.; Convex 4Q1987 income includes $.9M and $.5M in extraordinary credits for 1987 and 1986, respectively; Gould 4Q1987 income $8.7M before discontinued operations and extraordinary charge due to reversal of tax loss carryforwards; HP for the quarter ending Jan. 31; Sperry 4Q1986 results in Unisys.*

Peripherals and Communications*						
Alloy	10.7	11.5	(7.3%)	(0.7)	0.7	NA
AST Research	92.6	47.1	96.4%	2.0	3.7	(45.1%)
Britton Lee	7.0	9.0	(22.1%)	(7.1)	0.1	NA
Cipher Data	45.4	45.2	0.5%	2.2	1.0	129.7%
Dataproducts	91.2	84.8	7.5%	1.1	2.1	(49.1%)
Emulex	30.4	25.7	18.5%	2.4	0.4	522.2%
Irwin Magnetic Sys	13.8	13.7	1.0%	0.9	0.9	(9.1%)
Key Tronic	32.3	24.7	30.6%	0.7	0.3	164.2%
Maxtor*	74.1	50.8	46.0%	5.2	6.9	(25.2%)

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Category/ Company	4Q/87 Rev. ($M)	4Q/86 Rev. ($M)	% Change	4Q/87 Earn. ($M)	4Q/86 Earn. ($M)	% Change
Micropolis	80.4	51.8	55.2%	7.2	5.1	39.7%
Miniscribe	116.2	52.9	119.7%	9.1	6.4	42.3%
Network Systems	35.9	31.6	13.6%	5.6	6.5	(14.9%)
Priam	34.7	31.1	11.5%	0.4	(33.8)	NA
Quantum	56.7	33.9	67.1%	4.7	0.7	572.3%
Rexon	30.0	22.5	33.7%	2.5	1.6	54.9%
Seagate	332.5	251.9	32.0%	22.8	37.6	(39.3%)
Storage Tek	208.2	184.3	13.0%	5.6	8.3	(32.3%)
Ungerman-Bass	38.3	32.3	18.4%	2.7	2.0	36.4%
Western Digital*	160.7	114.4	40.4%	0.3	11.0	24.3%
Wyse	128.1	73.1	75.2%	7.4	4.8	55.4%
Xebec	7.6	27.5	(72.4%)	(1.1)	(1.0)	NA
Subtotal	1,626.8	1,220.0	33.4%	81.8	65.3	25.3%

**Bridge removed from sample due to acquisition by 3Com; Maxtor 1986 results reflect U.S. Design acquisition; Tandon figures not available at deadline; Western Digital figures reflect Faraday and Paradise acquisitions.*

Software/Services/VARs						
Ask Computer	32.3	21.2	52.9%	2.3	2.0	12.9%
ADP	376.7	334.2	12.7%	40.1	30.0	33.7%
Boole & Babbage	12.3	9.3	32.9%	3.9	0.4	861.5%
Comdisco	327.0	268.0	22.0%	(56.0)	8.0	NA
ComputerAssoc*	195.1	134.4	45.1%	42.8	24.9	72.2%
Computer Sci.	287.3	257.5	11.6%	10.3	7.6	35.9%
Computervision	155.4	136.5	13.8%	8.0	3.5	131.6%
Cullinet*	54.2	44.7	21.3%	(12.7)	(5.4)	NA
Cybertek	5.6	6.5	(14.0%)	0.3	0.5	(37.9%)
Daisy Systems	28.0	25.4	10.5%	1.0	(1.3)	NA
Data I/O	16.9	17.9	(5.1%)	(5.6)	1.2	NA
Informix	14.0	6.6	110.0%	2.0	0.9	120.1%
Intellicorp	5.0	4.9	0.4%	(1.0)	(0.5)	NA
Intergraph	195.3	157.4	24.1%	24.7	19.5	26.7%
Interleaf	17.0	10.4	63.4%	2.5	0.4	602.3
Lotus	115.6	81.8	41.3%	22.9	15.6	47.1%
Mentor Graphics	61.4	49.3	24.5%	6.1	3.9	55.9%
Microsoft	155.9	81.0	92.5%	35.3	19.7	79.4%
Software Pub.	14.0	8.7	60.9%	2.5	1.5	66.7%
Symbolics	23.8	26.5	(10.3%)	(15.4)	(3.4)	NA
VM Software	11.5	10.4	10.3%	2.3	2.5	(6.0%)
Subtotal	2,104.4	1,692.6	24.3%	116.4	131.3	(11.3%)

**Computer Associates includes UCCEL 4Q1986 results adjusted to CA policies; Comdisco 4Q income after deducting $80M and $22M for 1987 and 1986, respectively; Cullinet for quarter ending Jan. 31; MSA figures not available at deadline.*

Semiconductors/Components						
AMD*	262.5	197.7	32.8%	(2.6)	(16.3)	NA
Chips & Tech.	32.4	16.5	96.9%	5.6	3.1	81.9%
Cypress	24.3	14.8	64.3%	4.0	4.0	0.4%
Intel	572.5	355.6	61.0%	95.5	(16.4)	NA
LSI Logic	78.3	54.5	43.6%	5.8	1.7	237.2
Texas Instruments	1,534.7	1,335.8	14.9%	93.7	26.6	252.3%
Subtotal	2,504.7	1,974.9	26.8%	202.0	2.6	7688.5

**AMD results restated to reflect acquisition of Monolithic Memories.*

TOTAL	**41,528.3**	**36,270.9**	**14.5%**	**3,806.1**	**1,941.2**	**96.1%**

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Category/ Company	1987 Rev. ($M)	1986 Rev. ($M)	% Change	1987 Earn. ($M)	1986 Earn. ($M)	% Change
Computer Systems						
Alliant*	53.8	30.8	74.9%	6.9	4.5	51.2%
Altos	168.2	139.5	20.6%	14.3	7.7	85.7%
Amdahl	1,505.2	966.3	55.8%	146.0	41.8	249.0%
Apollo	553.7	391.7	41.4%	21.7	9.3	132.5%
Apple	3,041.3	2,030.3	49.8%	280.4	155.5	80.3%
Compaq	1,224.1	625.2	95.8%	136.3	42.9	217.7%
Computer Consoles	148.4	129.6	14.5%	11.3	(4.4)	NA
Control Data	3,366.5	3,346.7	0.6%	19.3	(264.5)	NA
Convergent Tech*	384.8	305.8	25.8%	(32.6)	(32.8)	NA
Convex	69.6	40.2	73.3%	8.8	4.0	121.5%
Cray	687.3	596.7	15.2%	147.1	124.8	17.8%
Data General	1,304.0	1,207.5	1.3%	(117.9)	(26.8)	NA
Digital	10,391.2	8,415.2	23.5%	1,284.3	861.6	49.1%
Gould	933.4	908.8	2.7%	(95.6)	(101.8)	NA
Harris	2,108.3	2,115.2	(0.3%)	92.2	68.6	34.4%
Hewlett Packard*	8,542.0	7,245.0	17.9%	707.0	523.0	35.2%
IBM	54,217.0	51,250.0	5.8%	5,258.0	4,789.0	9.8%
Kaypro	98.1	93.8	4.6%	(11.5)	3.8	NA
MAI Basic Four	334.3	287.9	16.1%	24.9	18.	36.3%
MASSCOMP	80.8	62.8	28.6%	6.6	3.3	100.6%
NBI	261.5	283.1	(7.6%)	(17.9)	(9.6)	NA
NCR	5,640.7	4,881.6	15.5%	419.3	336.5	24.6%
Prime	960.9	860.2	11.7%	64.8	46.9	38.0%
Pyramid	59.6	44.2	34.9%	4.1	(3.5)	NA
Silicon Graphics	116.0	59.3	95.4%	11.9	5.7	108.1%
Sperry*	0.0	3,026.5	NA	0.0	122.1	NA
Stratus	184.2	124.6	47.8%	19.4	13.5	43.5%
Sun Microsystems	754.4	342.7	120.2%	48.0	24.1	99.2%
Tandem	1,079.7	838.0	28.9%	102.2	79.2	29.1%
Tandy	3,654.7	3,322.8	10.0%	289.8	216.4	33.9%
Unisys*	9,712.9	7,432.4	30.7%	578.0	(43.4)	NA
Wang	3,047.6	2,668.9	14.2%	94.5	(102.6)	NA
Subtotal	114,683.9	104,153.3	10.1%	9,521.5	6,913.3	37.7%

**Alliant 1987 and 1986 incomes include $3.M and $2.1M in extraordinary credits, respectively; Convergent's Convergent Technologies subsidiary reported $255M in 1987 revenue, up 12.3% from $227M in 1986, and earnings of $4M, compared to a loss of $30M in 1986; HP for years ending Jan. 31; Unisys figures include Sperry 1Q and 2Q1986 figures.*

Peripherals and Communications*						
Alloy	44.6	40.9	9.2%	1.4	2.0	(30.3%)
AST Research	266.7	192.1	38.8%	9.5	16.1	(40.6%)
Britton Lee	25.7	31.5	(18.3%)	(13.6)	0.1	NA
Cipher Data	172.9	180.8	(4.4%)	5.2	7.5	(30.4%)
Dataproducts	334.2	350.8	(4.7%)	(3.6)	12.8	NA
Emulex	112.3	105.8	6.2%	5.5	6.4	(14.2%)
Irwin Magnetic Sys	51.1	45.9	11.3%	3.3	4.3	(23.6%)
Key Tronic	120.8	107.3	12.6%	3.9	(2.4)	NA
Maxtor*	239.4	153.1	56.4%	16.1	20.9	(23.0%)

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Category/ Company	1987 Rev. ($M)	1986 Rev. ($M)	% Change	1987 Earn. ($M)	1986 Earn. ($M)	% Change
Micropolis	288.3	213.1	35.2%	27.2	18.3	49.3%
Miniscribe	362.5	184.9	96.1%	31.1	22.7	37.1%
Network Systems	120.5	108.8	10.8%	17.5	18.0	(3.1%)
Priam	137.1	123.0	11.4%	(4.7)	(40.6)	NA
Quantum	178.3	116.5	53.0%	8.1	12.7	(36.2%)
Rexon	110.2	64.0	72.1%	10.1	4.0	153.3%
Seagate	1,075.7	709.5	51.6%	115.3	90.4	27.6%
StorageTek	750.0	696.0	7.8%	26.0	36.2	(28.1%)
Ungerman-Bass	143.8	108.7	32.2%	6.9	0.0	NA
Western Digital*	563.1	373.5	50.7%	48.6	33.7	44.3%
Wyse	388.7	234.8	65.6%	25.3	16.9	49.9%
Xebec	49.4	114.7	(56.9%)	(41.7)	(2.6)	NA
Subtotal	5,485.8	4,140.9	32.5%	339.2	280.0	21.1%

**Bridge removed from sample due to acquisition by 3Com; Maxtor 1986 results adjusted to reflect U.S. Design acquisition; Tandon figures not available at deadline; Western Digital figures reflect Faraday and Paradise acquisitions.*

Software/Services/VARs						
Ask Computer	115.8	85.7	35.1%	8.4	7.2	17.0%
ADP	1,467.0	1,298.1	13.0%	149.9	115.5	29.8%
Boole & Babbage	44.8	35.9	24.5%	5.6	1.3	322.9%
Comdisco	1,202.2	988.2	21.7%	29.9	63.3	(52.8%)
ComputerAssoc.*	647.5	405.0	59.9%	85.1	43.1	97.3%
Computer Sci.	1,133.8	977.7	16.0%	40.5	30.3	33.8%
Computervision	564.0	494.7	14.0%	19.5	(5.8)	NA
Cullinet*	213.4	169.4	26.0%	(30.6)	(19.8)	NA
Cybertek	23.0	26.9	(14.2%)	0.5	2.4	(79.2%)
Daisy Systems	103.5	96.0	7.9%	(14.0)	(8.7)	NA
Data I/O	66.3	66.5	(0.3%)	(4.3)	4.5	NA
Informix	41.6	21.1	97.2%	5.9	2.5	141.2%
Intellicorp	21.3	19.9	7.4%	(4.3)	3.1	NA
Intergraph	641.1	605.7	5.8%	69.9	70.4	(0.7%)
Interleaf	52.1	32.2	61.5%	5.2	(0.8)	NA
Lotus	395.6	282.9	39.9%	72.0	48.3	49.2%
Mentor Graphics	221.8	173.5	27.8%	20.3	11.0	84.8%
Microsoft	456.7	260.2	75.5%	92.9	57.7	61.2%
Software Pub.	43.9	25.4	72.8%	6.5	1.6	297.1%
Symbolics	101.6	112.6	(9.8%)	(23.4)	(16.8)	NA
VM Software	30.6	27.0	13.3%	3.4	4.9	(30.8%)
Subtotal	7,587.4	6,204.6	22.3%	538.9	415.1	29.8%

**Computer Associates includes UCCEL 1986 results adjusted to CA policies; Cullinet for year ending Jan. 31; MSA figures not available at deadline.*

Semiconductors/Components						
AMD*	997.1	828.6	20.3%	(48.1)	(94.0)	NA
Chips & Tech.	112.3	41.3	171.9%	17.9	7.5	138.6%
Cypress	77.3	50.9	51.8%	13.4	13.4	(0.1%)
Intel	1,907.1	1,265.0	50.8%	248.1	(173.2)	NA
LSI Logic	262.1	194.3	34.9%	11.3	3.9	194.2%
Texas Instruments	5,594.5	4,974.0	12.5%	308.5	29.1	960.1%
Subtotal	8,950.4	7,354.2	21.7%	551.1	(213.3)	NA

**AMD results restated to reflect acquisition of Monolithic Memories.*

TOTAL	**136,707.5**	**121,852.9**	**12.2%**	**10,950.7**	**7,395.0**	**48.1%**

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THE GRAY SHEET
Computer Industry
REPORT

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"Cycle and Epicycle, Orb in Orb": IBM's Latest Reorganization

IBM restructured because Armonk, after years of denial, finally realized that it has a real problem on its hands. Things aren't, nor are they soon going to get, significantly better.

The problem has assumed many shapes in the past three or four years, of which the most recent incarnation has been the company's mid-range erosion. But IBM's bad situation persists into 1988 not only because of specific weaknesses in its product set and generally unfavorable product cycles. And the problem isn't simply arrogance. IBM's difficulties have overshadowed IBM's genuine efforts to work more closely with customers and expand relationships with independent suppliers and developers.

Something even more fundamental has gone awry in Armonk — namely, IBM's strategic management, planning, and control systems. Ideally, a commercial organization's structure should conjoin its competitive environment (market position and stakeholder requirements) and strategic capabilities (managerial, technical, financial, and product). Vivifying this structure should be a leadership communicating values and purposes, setting goals and objectives, and evaluating organizational performance. Prima facie evidence that IBM was falling considerably short of the ideal was the fact that suddenly competitors and customers were asking, who's afraid of Big Bad Blue?

How did this happen to IBM, once (if you believed the Harvard Business School case studies) among the most graceful examples of capitalism in action? And what are they doing to regain their competitive balance?

In the early 1980s IBM appeared to many observers a consummately effective organization. Its major products, among them the 308X, S/36, and Personal Computer, were uniformly peaking in their product cycles. It was the most profitable company in any sector of the economy, seemingly capable of almost any strategic feat if it put its mind and resources to it.

But, to its credit, IBM recognized change on the horizon. When John Akers ascended to IBM's presidency, his goal was to make the company less concerned with selling products, and more concerned with selling systems. He perceived that the market was demanding connectivity, ease-of-use, and tools for customizing solutions.

Mr. Akers' primary objective was to vastly improve the interoperability of IBM's many product lines. Providing IBM-driven solutions for unifying IBM's computer products was necessary because IBM could not perpetuate major technical distinctions between top-dollar product lines and expect customers to foot the bill of integrating them. Moreover, the competition (e.g., DEC, Tandem) had begun to compete on the basis of a total enterprise marketing strategy.

Meeting this challenge required a rethinking of corporate structure. IBM had always been a highly integrated company, except at the product level. To give the company a system focus, Mr. Akers and IBM's other chiefs decided to integrate decision-making at the product level as well.

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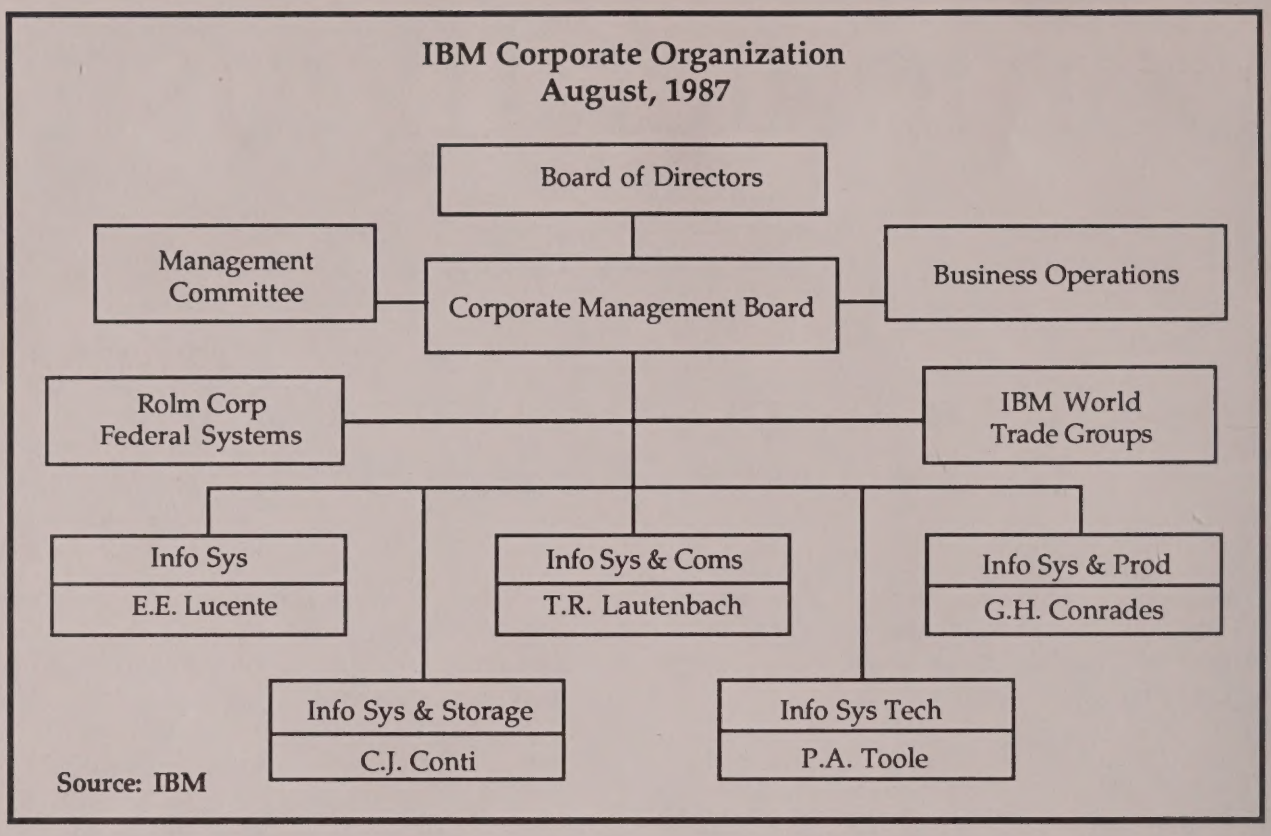

In January, 1985, a corporate restructuring made the Corporate Management Board (CMB) the omnipotent arbiter of IBM policy and operations. Comprised of up to eighteen members at the Group Executive level and above, the CMB oversaw the formation and implementation of product strategy. Large customers were encouraged, even invited, to express their concerns directly to CMB members.

Akers further assured purposeful communication among his Group Executives by incorporating all marketing functions in the Information Systems Group (ISG). Under the leadership of Ed Lucente, its VP and Group Executive, ISG assumed tremendous responsibility, and ultimately power, since no product nor program could be brought to market without ISG's express written consent. The operating assumption was that since ISG's field sales people spend the most time with the customer, they would best know customer requirements.

It was a nice idea, but it didn't work. Initially IBM's slide could be attributed to adverse product cycles. All at once the mainframe market eroded, the S/36 was derailed by small-scale competitors that were more powerful and often much cheaper, and IBM's PC line came under attack from two fronts: vendors packaging inexpensive clones, and manufacturers adding functions and features that eluded Entry Systems Division planners.

Costs became another scapegoat. Allegedly too many paper-pushing middle managers were being protected by excessive bureaucracy. A massive effort to sweep out inefficiency led to the "early retirement" of 16,000 employees.

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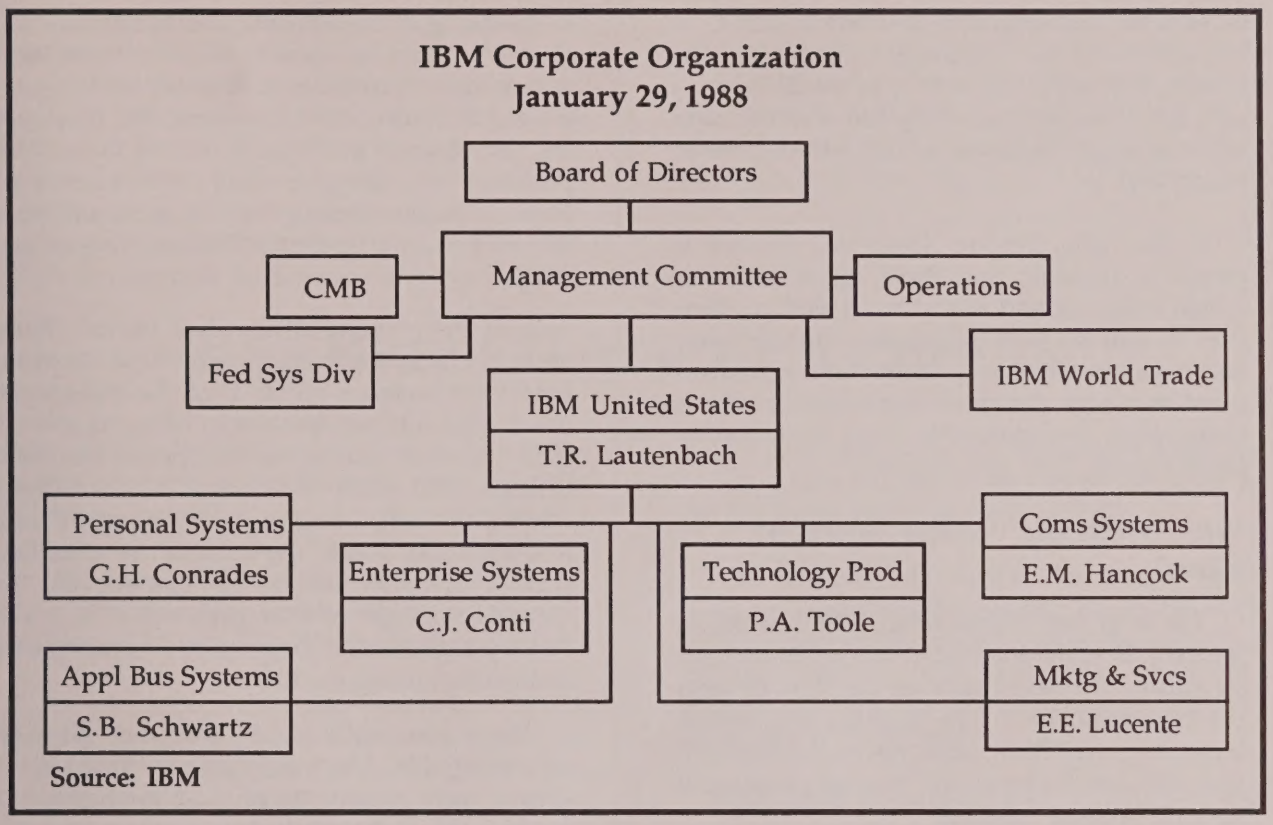

Many others were transferred to ISG's field sales organization where they could be put on quota — and watched very carefully.

A few of Big Blue's top executives, though, decided that IBM's real difficulty was organizational stasis. The organization that Akers had crafted might have been perfect for IBM's needs at another time, but not during the Great Softness, and not, some apparently felt, during Digital's blitzkrieg.

First, in times of instability most firms try to become more flexible and better positioned to respond at the margin. IBM, in contrast, had been integrating authority, categorically assuming that its strong corporate culture would superconduct information to, from, and within the CMB, so that current and future market requirements could be concurrently addressed by the most senior decision makers.

Second, as IBM entered a period of soul-searching uncertainty, it desperately needed the best available information at a time when the quality of information was extremely variable.

In particular, the argument goes, the information demands of Mr. Lucente's ISG and the product groups became increasingly unbalanced. ISG supposedly evolved into an information-consuming beast, refusing to act until long after product groups were satisfied that a given competitive move or response was appropriate. In IBM's comprehensively integrated organization, ISG became a bottleneck that led to stagnation.

To stagnation — and to friction, as product groups locked horns with ISG. Too many of these skirmishes had to be reconciled in the chairman's office. For example, the 9370 remained in development for four years until, reportedly, Mr. Akers himself untied the knot.

During those four years on the drawing board, while IBMers argued among themselves

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as to what was required of the 9370, DEC et alia redefined the midrange market. IBM became a follower, finally forcing the 9370 into a role that it couldn't possibly fill. For this, and other strategic miscues, some at IBM came to blame ISG.

In the early 80s Mr. Akers had set out to create a dynamic and fluid organization in which authority and resources flowed to where they would be best employed. Instead what had developed was a decision-making environment in which decisions were more costly to make and, paradoxically, less systematic. Quite simply, IBM lost control.

What Hath the Powers Wrought Now?

The corporate restructuring IBM unveiled on January 28 differentiated IBM's organizational structure. To better balance the flow of information within IBM, five "highly independent" business units (IBUs) were created, each responsible for development and market planning of specific product families.

The five IBUs provide a "looseness" to IBM's organization. To provide a complementary "tightness," IBM created a new organizational entity, IBM United States, to oversee the operations of the five IBUs and Mr. Lucente's organization, now called the IBM U.S. Marketing and Service Group. Furthermore, the CMB was pointedly subjugated to a Management Committee that consists of just six people.

The restructuring highlights IBM's emphasis on action as a value. The three key individuals promoted — Terry Lautenbach to the powerful position of General Manager, IBM United States, and Ellen Hancock and Steve Schwartz to Group Executives of two of the IBUs — are known as doers, not panelists.

All IBMers will be evaluated on their ability and willingness to deal with local challenges. In the future, we won't likely see directives for sweeping change, like major cutbacks in employment, or product decisions emanate directly from the chairman's office. Instead local actions will be taken on a smaller scale.

Speaking of the chairman, it is currently unclear what exactly his role will be. More local autonomy certainly means less day-to-day power for Mr. Akers. IBM spokespeople, however, are taking great pains to point out that, while pressure was being exerted on a variety of fronts, the restructuring was his idea, and he is still very much in control. The one thing no one at IBM wants is a lame duck leader.

One thing the chairman has started doing more of is granting exclusive interviews to members of the business press. There have been moments over the past few weeks when Akers suddenly seemed almost as omnipresent as John Sculley. But while Mr. Akers' face will more frequently visit the pages of ***Fortune***, ***Forbes***, and ***Business Week***, the most active decision-making executive will be Mr. Lautenbach. As General Manager of IBM United States, it will be his job to promote cooperation and manage coordination among the IBUs.

His is a critical role. In announcing the restructuring Mr. Akers strongly reaffirmed IBM's commitment to provide product interoperability, but the restructuring itself veers sharply away from the concept of collective effort. After the cheerleading and congratulations die down, the IBUs may commence with their independent pursuit of individual ends.

Indeed, the process has already begun with MVS/Enterprise Systems Architecture (ESA), which is an Enterprise Group undertaking addressing Enterprise Group concerns. For example, as it currently stands, applications developed for MVS/ESA will apparently not then be portable to other SAA environments. The ***Gray Sheet*** believes that this is the first of many such announcements we can expect from IBM's IBUs in 1988. *(Note: the next issue of the **Gray Sheet** will explore the MVS/ESA announcement in greater detail.)*

The great danger to other players in the computer industry is that the sum of individual IBU actions will generate significant points of strategic discontinuity. It was pretty easy to poke at IBM when it was sitting still. A five-headed hydra is going to be much more challenging.

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But the same great danger holds true for IBM too. When one looks closely at IBM's new organizational layout, one is struck by its similarity to the pre-Akers corporate arrangement — the one judged ill-suited to compete in a networked world, and arguably the one from which sprang IBM's current competitive disadvantages in multiuser systems.

Perhaps history won't repeat itself and the IBUs will voluntarily respect IBM's "general will" and behave accordingly. But if they don't, Mr. Lautenbach must expediently navigate that fine line between selfish and selfless for them. If he can, he may one day be king.

Big Blue's Time of Troubles

Two weeks after the reorganization there appeared what can be considered a series of public footnotes explaining why the powers-that-be in Armonk felt they had to move, and move quickly: the fiscal details of last year's poor showing. The 1987 IBM annual report highlights a number of indices of Big Blue's recent problems.

For example, while the proportion of the company's revenue from processors has remained fairly static for the past four years, peripherals have been sliding steadily southward recently. In 1985 peripherals actually brought in more revenue than processors, but then dropped 11% in 1986 and another 6% in 1987. A new area of slippage developed in 1987 due to new maintenance pricing. Also, the growth in software revenue slowed slightly (up 24% compared to the 30+% registered in 1986 and 1985).

The best news for IBM is that workstations were up again (in other words, the PS/2s were able to make up for weakness in S/36 and other products bundled into this category). Nevertheless, 1987 results in this category still fell short of their 1985 high.

The most important news revealed by the annual report, though, is just how weak its U.S. business has been. In the U.S., processor revenue, which fell 5% in 1986, slipped another 2%

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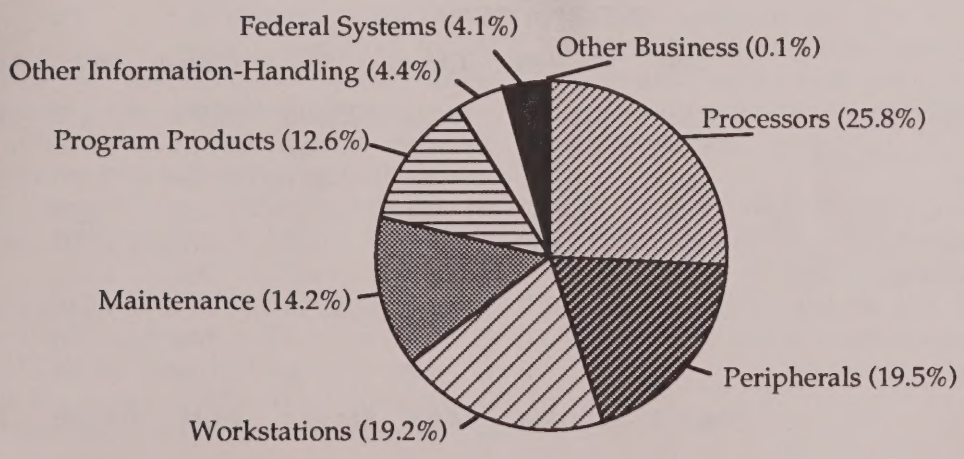
IBM 1987 Worldwide Revenue by Business Segments

(Source: IBM Annual Report, 1987)



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IBM Revenue ($B) by Industry Segment, 1984-1987

(Source: IBM Annual Reports)

WORLDWIDE

	1984	1985	Change	1986	Change	1987	Change
Information-Handling	$44,224	$47,926	8.4%	$49,061	2.4%	$51,912	5.8%
Processors	11,953	12,081	1.1	13,161	8.91	3,989	6.3
Peripherals	11,576	12,658	9.3	11,264	(11.0)	10,591	(6.0)
Workstations	9,942	10,551	6.1	9,429	(10.6)	10,429	10.6
Maintenance	5,266	6,103	15.9	7,413	21.5	7,691	3.8
Program Products	3,197	4,165	30.3	5,514	32.4	6,836	24.0
Other	2,290	2,368	3.4	2,280	(3.7)	2,376	4.2
Federal Systems	1,645	2,057	25.0	2,121	3.1	2,238	5.5
Other Business	68	73	7.4	68	(6.8)	67	(1.5)
TOTAL	**$45,937**	**$50,056**	**9.0%**	**$51,250**	**2.4%**	**$54,217**	**5.8%**

U.S.

	1984	1985	Change	1986	Change	1987	Change
Information-Handling	$25,666	$26,389	2.8%	$23,181	(12.2%)	$22,641	(2.3%)
Processors	6,412	5,794	(9.6)	5,499	(5.1)	5,374	(2.3)
Peripherals	6,906	7,307	5.8	5,573	(23.7)	4,822	(13.5)
Workstations	6,304	6,145	(2.5)	4,662	(24.1)	4,890	4.9
Maintenance	3,106	3,666	18.0	4,016	9.5	3,688	(8.2)
Program Products	1,708	2,176	27.4	2,367	8.8	2,817	19.0
Other	1,230	1,301	5.8	1,064	(18.2)	1,050	(1.3)
Federal Systems	1,645	2,057	25.0	2,121	3.1	2,238	5.5
Other Business	60	65	8.3	60	(7.7)	58	(3.3)
TOTAL	**$27,371**	**$28,511**	**4.2%**	**$25,362**	**(11.0%)**	**$24,937**	**(1.7%)**

INTERNATIONAL

	1984	1985	Change	1986	Change	1987	Change
Information-Handling	$18,558	$21,537	16.1%	$25,880	20.2%	$29,271	13.1%
Processors	5,541	6,287	13.5	7,662	21.9	8,615	12.4
Peripherals	4,670	5,351	14.6	5,691	6.4	5,769	1.4
Workstations	3,638	4,4062	1.1	4,767	8.2	5,539	16.2
Maintenance	2,160	2,437	12.8	3,397	39.4	4,003	17.8
Program Products	1,489	1,989	33.6	3,147	58.2	4,019	27.7
Other	1,060	1,067	0.7	1,216	14.0	1,326	9.0
Federal Systems	0	0	NA	0	NA	0	NA
Other Business	8	8	0.0	8	0.0	9	12.5
TOTAL	**$18,566**	**$21,545**	**16.0%**	**$25,888**	**20.2%**	**$29,280**	**13.1%**

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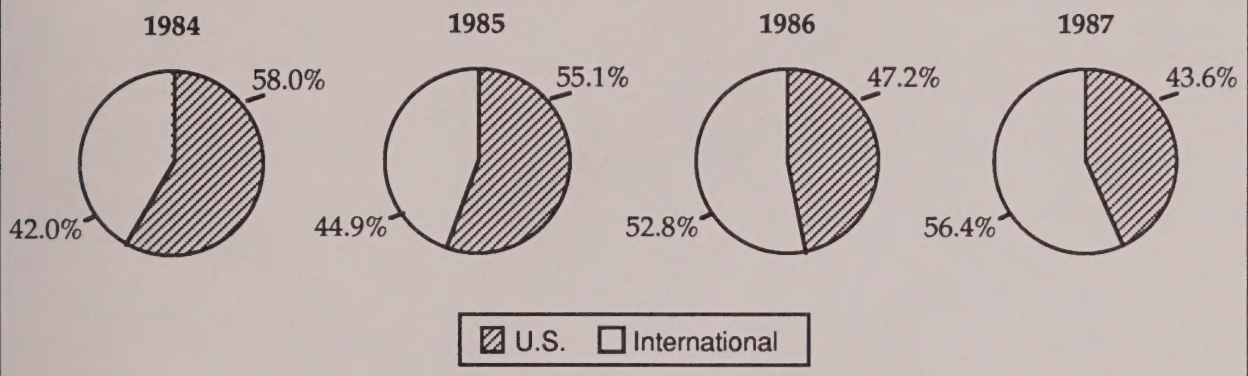
U.S. and International Proportions of IBM Information-Handling Revenue 1984-1987

(Source: IBM Annual Reports)



in 1987. U.S. peripherals revenue suffered a 13.5% drop after the 24% fall registered the previous year, while U.S. maintenance revenue, which had grown 9.5% in 1986, fell 8% in 1987. U.S. workstation revenue was up just 5%, and therefore was only 80% of what it had been in 1985.

With the U.S. proportion of overall IBM revenue slipping from 58% in 1984 to under 44% in 1987, need anyone inquire further as to why IBM's recent reorganization centers around a new IBM United States organization?

Still, that's not to say that all is rosy overseas. Information-handling revenue on the international side rose 13%, with even peripherals registering a gain (albeit miniscule). However, without the increment from currency translation, by IBM's own figures its 1987 international revenue would have been essentially flat (down 0.3%) compared with 1986.

When the 2% drop in U.S. revenue is added in, worldwide revenue would have fallen 1% in 1987 had IBM not benefited from the weak dollar in its overseas business. What this suggests is that, for IBM at least, real international demand is once more becoming congruent with U.S. demand (or lack thereof).

IBM started stating the effect of currency differentials back when it wanted to argue that the international market was actually better than it looked when translated into dollars. Thus it held that its international market in 1984, rather than growing only 9%, would have grown nearly 19% in 1983 dollars. This higher rate was within a few millimeters of U.S. growth.

For the next few years, as the currency pendulum swung against the dollar, growth in the real international demand as defined by IBM became markedly higher than U.S. growth. In 1985, international growth in 1984 dollars would have been 18%, compared to 4% growth in the U.S. In 1986, the international market would have been flat, but the U.S. market was falling 11%.

The fact that both are now even at a flat-to-slightly-down mark is not an auspicious sign for IBM when the dollar does finally stabilize. If the dollar stays flat, so does IBM. If the dollar should actually gain ground. . . .

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• **TANDEM MOVES.** The $260 million Tandem/Ungermann-Bass merger announced February 16 follows the recent trend of major systems vendors acquiring additional data comm/networking expertise from specialized companies that could use stronger backing (cf. Unisys/Timeplex). After citing Tandem and HP as the two systems vendors that think the way he does, Ralph Ungermann recently told the ***Gray Sheet*** that the company's position as an unbiased networker would best be preserved by corporate independence, but the first consideration if a merger were broached would be "the best interest of the shareholders."

Less predictable was Tandem's agreement with MIPS Computer to develop future Unix products based on MIPS' RISC technology. Tandem may have felt that with systems and DBMS rivals starting to solve some of the long-standing problems for OLTP on Unix systems, it would need more potent hardware than its LXN supermicros from Altos to stay competitive in that environment. It will be interesting to see the degree to which Tandem can or will transfer OLTP and DBMS functionality from its Guardian operating system to future Unix offerings.

• **CRAY'S Y-MP STOPGAP.** To give some breathing space to its X-MP customers (two-thirds of its installed base), Cray has unwrapped the Y-MP. With up to eight processors rather than four and a 6ns clock rather than 8.5ns, the Y-MP/832 is reportedly up to three times as fast as the X-MP/4. Not only will it put Cray back into contention for the supercomputer speed record until the Cray-3 is shipped, but it also increases the company's commitment to Unix.

• **UNIX FROM APPLE.** Shipments of A/UX, Apple's Unix implementation to allow the Mac II to compete better as a technical workstation and in VAR/government sales, officially began on February 9. The biggest selling point is likely to be its Macintosh Toolbox features, which will allow Unix developers to access the Macintosh user interface in the Mac II's ROM.

• **CYBER UNIX.** CDC finally announced what it has been informally reporting for the past year: it will offer a native Unix option on its Cyber systems, reflecting the emerging standardization of scientific/engineering applications on Unix systems from workstations to supercomputers. However, CDC is still betting on NOS/VE for features still missing from or inadequately addressed by Unix (e.g., fault tolerance, security, and workload management).

• **HP OFFICE SOFTWARE TO UNIX PORT.** In another Uniforum announcement, HP stated that it will port its major office products, including (as previously announced) the NewWave application environment, to Unix. HP "believes it is the first major systems vendor to commit to offering its complete family of office-services software for both a proprietary and an open operating system."

• **THE OS/2 WARS.** In Compaq's ongoing crusade to establish that OS/2 will run equally well on its PCs as on IBM PS/2s, it held another New York forum. The centerpiece was delivery of MS OS/2 Standard Version 1.0 (the equivalent IBM product, Compaq avers, runs just fine on Compaq 386 machines — the only non-IBM 80386-based PCs that's allegedly true for). Among the software participants was Ashton-Tate, which took the opportunity to introduce SQL-compliant dBASE IV for MS-DOS and OS/2. One sign of the upsizing of PC software functionality is that dBASE IV uses 400,000 lines of code — four times what dBASE III took. But the emerging conflict with downsized mid-range software was sharpened when that same day Oracle unveiled its OS/2 product.

• **NO ALF EITHER.** Computer Memories, whose first plan to invest its remaining capital in an entertainment company by "purchasing" Hemdale Film fell through, now has had to scuttle a project to "merge" with DIC Animation City. If CMI is serious about getting involved with Saturday morning cartoon shows, maybe it should just start filming its merger discussions.

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THE GRAY SHEET
Computer Industry
REPORT

DONALD BELLOMY, EDITOR JANUARY 29, 1988 • VOL. 23, NO. 19 PATRICK J. MCGOVERN, PUBLISHER

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Prime's Conversion to the Carnegie Gospel of Health

The citadel has fallen. On January 28, Computervision announced that it had capitulated to Prime's merger proposal.

By then, CV had little leeway. While Computervision fruitlessly looked for a white knight, Prime turned the screws. On January 13, it raised its bid from $13.50 a share to $15 and extended the expiration date to midnight on January 27, but emphasized that this was its final, non-negotiable offer. Meanwhile Prime initiated a solicitation of Computervision shareholders to replace the CV board of directors in *toto* with a Prime slate because the CVers wouldn't promise not to swallow the company's poison pill.

Once it was clear that enough Computervision shareholders would accept Prime's bid, the positions of the entire CV board were threatened unless they sat down to talk with Prime. They sat. Everyone dropped their suits and countersuits, Computervision agreed not to swallow anything poisonous, Prime agreed to drop the move against the Computervision board, and CV's Bob Gable smiled through clenched teeth that now "we realize the very real synergy between both companies and what we can bring to the CAD/CAM market."

The merger is only the most immediately obvious part of Prime's new corporate strategy. The strategy is not peculiar to Prime, but reflects a trend that has been gathering momentum among a number of multiuser vendors. But Prime offers a particularly clear-cut illustration (cf. not only the Computervision takeover, but other January announcements as well).

The strategy is a pristine example of what the ***Gray Sheet*** calls the Andrew Carnegie Principle, after a Carnegie aphorism that his friend Mark Twain quoted in *Pudd'nhead Wilson*. It appeared in these pages two issues ago when the Prime/Computervision story first broke, but it bears repeating and emphasizing on Page One for the light it sheds on current industry trends. In Pudd'nhead Wilson's formulation of the Andrew Carnegie Principle:

> *Behold, the fool saith, "Put not all thine eggs in the one basket" — which is but a manner of saying, "Scatter your money and your attention"; but the wise man saith, "Put all your eggs in the one basket and — WATCH THAT BASKET."*

Less succinctly put, Carnegie's advice suggests that a company isolate its particular strengths and then center its activities around them, even if that means deemphasizing some traditional or otherwise attractive markets, products, distribution channels, and/or internal organizational structures. The Carnegie Principle would make most sense for companies beneath the top tier of major-market-share vendors in an era of less than dynamic growth. In other words, it would make sense for Prime Computer in the late 1980s.

What Prime has elected to do is to make the manufacturing sector the hub of its marketing wheel, and to turn the wheel on a CAD/CAE/CAM axis. Prime estimates that CAD/CAE/CAM represented almost 20% of corporate revenues in 1987, while manufacturing (including CAD) came to 25% of corporate revenue.

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Bob Fischer, president of Prime's CAD/CAM and Engineering/Scientific Group, has told the *Gray Sheet* that over the next two years the company intends to double the manufacturing proportion to half of Prime's total revenue (the CV acquisition practically does this by itself). CAD/CAE/CAM would serve as the entering wedge, to be followed up by an aggressive systems integration push.

There are two aspects of Prime's approach that are noteworthy. First, it is now focusing on one market in particular, rather than a group of three or four targeted markets. Recently the Prime corporate backgrounder has stated, "Key market segments are manufacturing, financial services, government and education." A draft revision would highlight manufacturing and relegate the other three to the category of "other" important markets.

More and more vendors are honing in on particular verticals as they attempt to find maneuvering room against IBM and Digital in a maturing U.S. computer market. The cant phrase is "selling solutions." In practice it means that no one can be all things to all people anymore (at least no one except maybe IBM and DEC). Targeting particular markets allows a vendor to put together a hardware/software package relevant to specific needs and to develop an identity as a customer's "partner" rather than simply a supplier.

That's the general thrust of the Andrew Carnegie Principle for the computer industry, but few vendors have followed its logic so inexorably that they have actually put most of their eggs in just *one* basket. That is the gamble that Prime is now taking in the interest of its long-term viability.

Of its four targeted markets, only one simultaneously offered attractive growth potential and a no-man's-land where Prime didn't start off so far behind some of its competitors that singling the market out might prove suicidal. CAD/CAE/CAM in manufacturing has been a company strength, even if it has not heretofore been able to leverage its entrenched position at Ford into a really significant share of the market. Prime will now attempt to do just that, although in deference to IBM and Digital's control of the heights it will at least initially go after non-Fortune 200 manufacturers.

The second aspect of Prime's strategy worth noting is how it is going about implementing it: opening its checkbook to purchase products and expertise, whether or not the owner wants to sell. The Computervision purchase vaults Prime in one leap from 3% to 12% of the U.S. CAD/CAE/CAM market. If it hadn't worked out, Prime would have looked elsewhere for less heady leaps. Likely purchases might have been the Schlumberger CAD/CAM division (formerly Applicon) or GE Calma.

The first intimations of this part of Prime's strategy came last February, when the company raised $375 million in an offering of convertible subordinated debentures specifically earmarked "to finance acquisitions that complement or expand Prime's business . . ." The first shoe to drop was Versacad, a privately held PC CAD company that Prime bought in September. That acquisition has been described by Bob Fischer as an insurance policy in case critical elements of the CAD market migrated north in MS-DOS/OS/2.

The second shoe, the one that hit with a resounding clang, was Computervision. But it probably won't be the last. Next could well be a company with expertise in manufacturing systems integration.

An interesting insight into the importance of this aspect of Prime's strategy occurred when the *Gray Sheet* asked Fischer about the prospects of Control Data in the same manufacturing CAD market targeted by Prime, particularly in view of CDC's successful Chrysler bid. A key component in the CDC/Chrysler deal is a flock of workstations from Silicon Graphics, the same manufacturer from whom Prime OEMs high-end 3D systems. Fischer dismissed CDC's chances unless it also found the financial wherewithal to expand by acquiring other people's software and knowledge. No knock on CDC, he added — Prime would have little chance of long-term success if it were not taking that route.

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The direct acquisition of technological and sales prowess is meanwhile complemented by a continuation of a "borrowing" strategy through a growing network of OEM relationships. The key hardware contracts today are with Sun and Silicon Graphics. Falling somewhere between the two, since Prime owns a piece of the company, is the new Prime minisupercomputer from Cydrome.

Prime's MXCL 5 (Cydrome's Cydra 5) will be a compute-server for CAD workstations. It is designed along the lines of the directed dataflow model, according to which processing speed is increased by prioritizing computations among multiple processors and reducing the possible number of wait states. Cydrome calls it fine-grained parallel processing; IDC thinks of it as a sophisticated refinement of pipelining. The Cydra/MXCL 5 will run Cydrix, a Unix V.3 variant tuned for symmetric multiprocessing.

The minisuper marketing arrangements reflect Prime's commitment to the Andrew Carnegie Principle. Prime will have free rein in two U.S. markets, manufacturing and financial, and all international sales. Cydrome's small sales force will have unimpeded access to research facilities (the mother's milk of high-performance startups), government, and other commercial opportunities, except that Prime has reserved 45 major accounts. Cydrome sales for earth resources and some government contracts will go through resellers.

Prime's attitude towards OEM sources like Cydrome or Sun is purely utilitarian. If they don't sell well, Prime is ready at the drop of a hat to cancel contracts and find alternative workstations or compute-servers. If they do sell well, Prime will consider the economics of developing its own products in place of them. Meanwhile the division of markets should prevent the kind of channel conflict that sometimes found Silicon Graphics and Prime sales personnel tripping over each other.

The Cydrome boxes are designed to offload computation-intensive processing from workstations, yet over 80% of Prime CAD is now done on its proprietary 50 series (Unix is currently available on this line only as a guest under Primos — a guest that few customers have invited to dance). The emphasis on the OEMed Unix solutions for CAD/CAE/CAM therefore inevitably raises the question of the future of Prime's proprietary architecture and operating system.

One part of the answer was unveiled on January 19, when the 4050 and 4150, two new office-environment systems, were introduced. Despite the emphasis on CAD/CAE/CAM, Prime execs expect that these systems, not the OEMed CAD products, will account for the lion's share of Prime's new business in 1988. They remind us of the old Prime: superminis for the cost-conscious.

Nevertheless, Prime is aware that its increasing emphasis on CAD and manufacturing ineluctably leads towards Unix. Where then will the 50s fit in? One response would be native Unix on the 50s, which would in effect divide the Prime market into two segments: a Unix-dominated manufacturing domain, and a proprietary Primos (and Prime Information System) universe for other direct sales and much of the VAR channel. Sailing between a proprietary installed base and new Unix business is a risky voyage, but one already undertaken by HP.

A more specific role for the 50s will emerge in a few months, when Prime is expected to unveil a 50-based project control system to manage CAD/CAE/CAM configurations to achieve the optimal and most efficient results. Initially it would be available only on Primos, but a Unix alternative is expected.

The Andrew Carnegie Principle is obviously risky. While it worked for Carnegie, Mark Twain went broke following his friend's advice. Prime has to bank on key Computervision personnel staying put (perhaps even more critical than software developers will be the sales people). To give some perspective on the problem, Valid Logic acquired Telesis early last spring to increase the CAD/CAE software vendor's market position. It gained share, but 1987 revenue for the new Valid is actually 9% below its pro forma performance in 1986.

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Moreover, putting all your eggs in one basket not only puts all the eggs at hazard, but gambles that the other "baskets" won't feel left out. Prime will have to manage a very delicate transition if it is to avoid alienating current Primos/Prime Information System customers (including VARs).

But Prime deserves points for courage at least; tomorrow's ultimate losers are likely to be the companies today that never recognized the problem or refused to bet the ranch to ensure future survival.

A Tale of Three Balance Sheets: IBM, Digital, Tandem

In today's anxious climate, any bad news from a computer vendor is magnified as investors grope to determine whether it might presage the feared recession. Three reports garnered especially nervous responses, for there were disappointing elements in the quarterlies from IBM, DEC, and Tandem. However, a case could be made in all three instances that the results were specific to each, and not generalizable to the industry as a whole.

The report from IBM was attractive only if one looked at the income growth for the quarter (50%), which allowed net earnings growth for the year of just under 10%. However, the comparison is with 1986, which was a bottom-line disaster — down 27% from 1985. If IBM's net earnings of $5.3 billion in 1987 are compared with its profits of two years ago, the results would be *down 20%* from the profits of $6.6 billion accrued in 1985.

IBM's major stumbling block remains weak hardware sales, which grew only 5% for the quarter and 6% for the year. At least the annual sales total didn't drop from the previous year, the way it did in 1986. However, the momentum that seemed to be building in the third quarter, when sales grew 9%, could not be maintained.

That would be bad enough, but the quarterly comparison point was again an unspectacular 4Q1986, when sales fell over 4% from the previous year. Ergo, sales in 4Q1987 were essentially flat (up .6%) compared to 4Q1985. After taking into account two years of erosion in the

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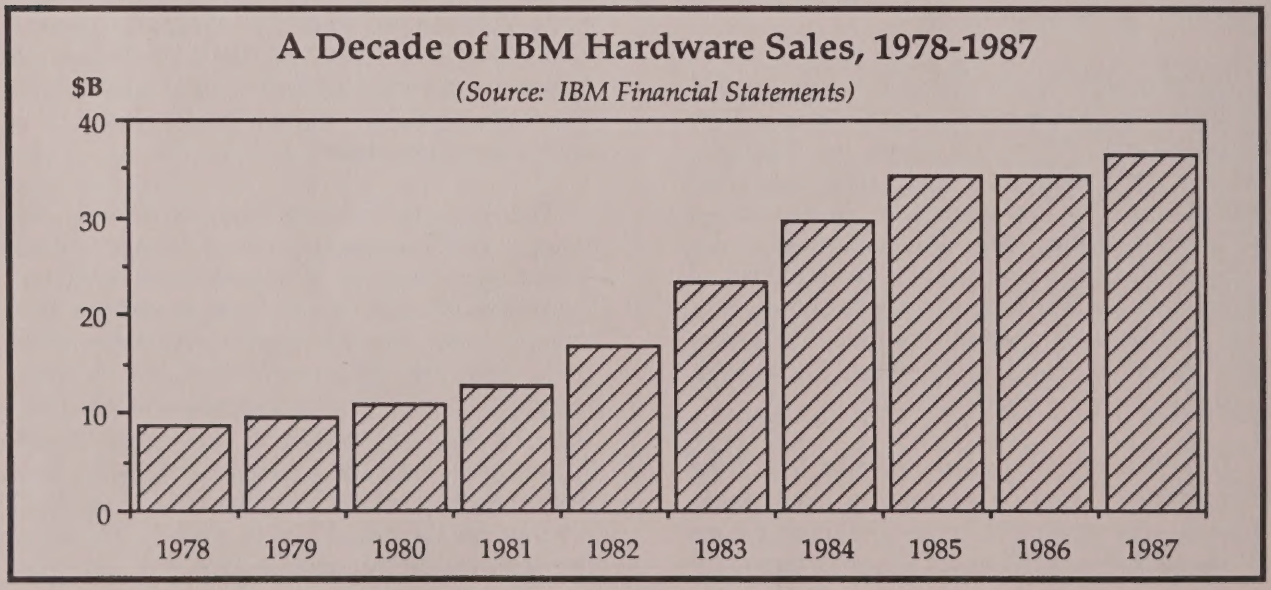

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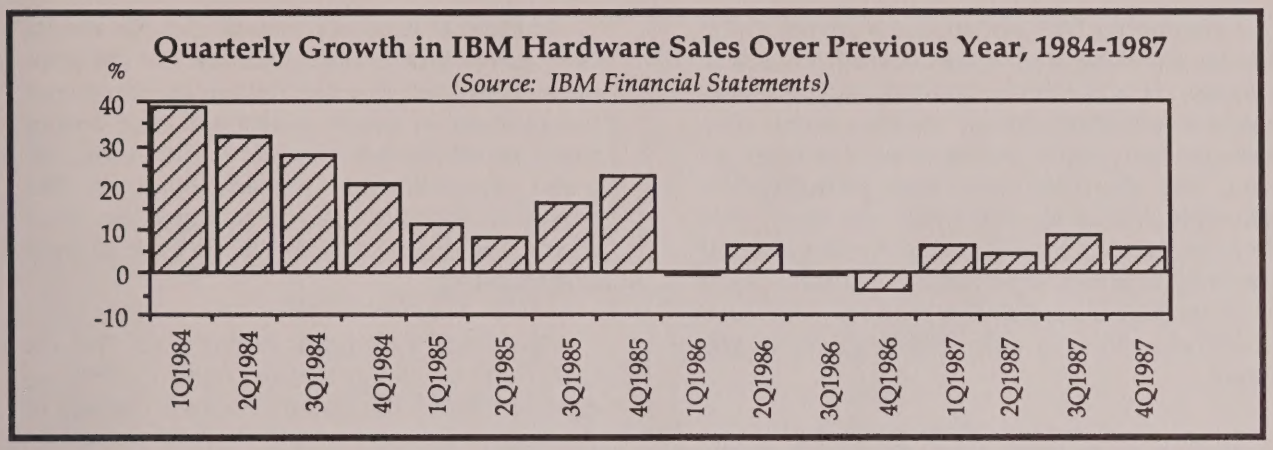

value of a dollar against most major currencies, this would mean that U.S. sales were sharply down.

The good news for everyone else is that bad news for IBM is no longer news. With the relative failure of the 9370s leaving nothing to take up the slack in the midrange, particularly as customers await word of Silverlake, with nothing dramatically new in mainframes, and with PS/2s still establishing themselves as successors to the XT and AT, there was in fact little reason to expect IBM's annual fourth-quarter jump in revenue to have been very spectacular this time around. Mediocre 4Q results speak volumes about IBM's current problems, but probably not about the industry as a whole.

Digital sales showed a slight dip in growth in the fourth quarter compared to the third, but remained essentially in the same line they've followed all year — up 22% in the first quarter, 21% in the second, 25% in the third, and 22% in the fourth. From this perspective, it's the especially strong third quarter (normally a lull between end-of-fiscal-year and end-of-calendar-year periods) that is the anomaly, not the fourth quarter.

A more troubling dip occurs in the quarterly profits column. The 22% net income growth from 4Q1986 (calendar) was entirely a function of interest accrual and a lower tax rate; operating income before figuring in interest and taxes was actually down 1%. This culminates a trend that had been building all year. In the first quarter, operating income nearly doubled over 1Q1986 (up 97%). In the second, it was up 51%. In the third, it was up 25%.

Digital is apparently paying the price for growing so fast and having to compete head-to-head with IBM. In particular, selling and general administrative expenditures ballooned over 40% in the fourth quarter.

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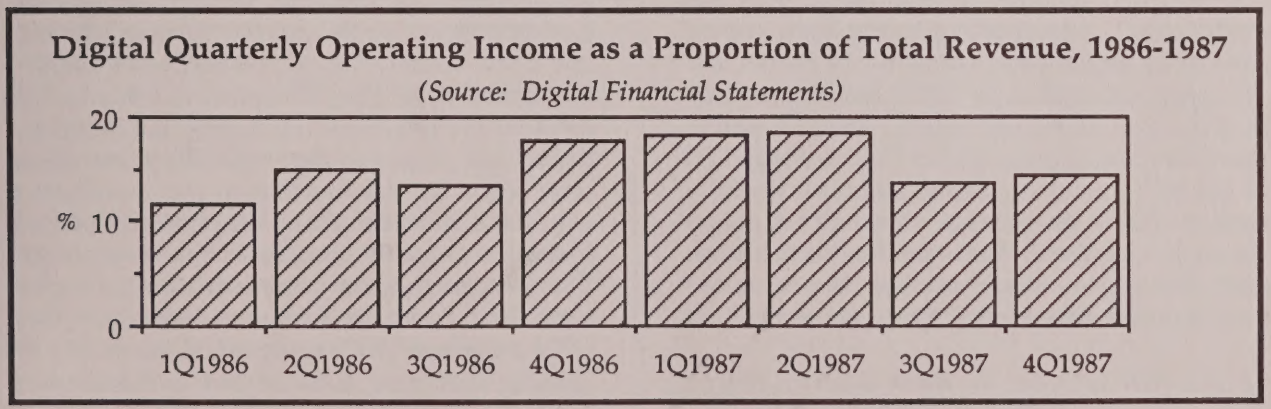

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Last quarter DEC announced a partial hiring freeze, ostensibly due to the uncertain economic climate. It was widely ignored, as DEC execs easily found justifications for new hires. The new quarterly report seems to have changed all that, and clarified what was probably the principal reason for the freeze all along: the company's need to impose more stringent cost controls. It is now reportedly easier for a camel to go through a needle's eye than for a rich new junior executive to enter the kingdom of Ken Olsen.

In any case, lower profit levels for a fast-growing vendor reveal nothing about the industry as a whole. The most troubling report from a major systems vendor was therefore Tandem's quarterly results: income fell 12.5% because revenue grew only 17.5%, due principally to a slowdown in U.S. sales. The growth reflects a currency-swollen 60% expansion in revenue from Germany and Japan and 40% growth in the U.K. and Canada.

Tandem at least is emphatic that 4Q results do not presage a downturn for itself or the economy. It organized a nationwide teleconference for analysts in which it stressed that during three out of the last four years, the fourth calendar quarter has been sequentially down. The company wants the record to show that it remains confident that sales will be back on track this quarter.

However, Tandem's explanation for the U.S. lull — "lengthening sales cycles" — doesn't resolve the issue; it simply restates it. Although Tandem has said that the slowdown was not centered on any particular market, its strength in the banking/financial community may leave it more exposed to budgetary jitters than other high-ticket vendors. At this point, the rest of the industry can only hope that Tandem execs are right about the anomalous nature of its U.S. performance in the fourth quarter.

Downsizing at the Service Station

The faster growth of microcomputers, whether PCs or small-scale systems, than their supermini and mainframe siblings has repercussions throughout the industry. A new IDC report on the U.S. computer maintenance market highlights the effects of downsizing on a too often ignored aspect of the computer business.

Hardware maintenance is by reputation a cash cow that vendors can continue to milk, no matter what is happening to the industry in general or a computer company in particular. The figures compiled by IDC's service program bear this out in the aggregate. The U.S. hardware maintenance market for 1987 is pegged at $14.8 billion. Compound annual growth through 1991 is projected at a few notches above 9%, to $21.2 billion. That may not be the most galvanizing growth rate around, but its long-term nature makes it mighty attractive.

The vast majority of those dollars, moreover, continue to flow to hardware manufacturers, who accounted for 73% of the hardware maintenance market in 1986. The total service income for systems manufacturers (including software support, supplies, education/training, and consulting as well as hardware maintenance) contributed 20% of manufacturers' total revenue.

Independent third-party service vendors like Sorbus and Intelogic keep a measure of pricing pressure on the computer manufacturers, but totted up only 12% of the hardware maintenance market in 1986. One piece of evidence indicating the relatively minor role the independents have played in the service business was a sentence in the announcement last month that MAI Basic Four would buy the portion of Sorbus dedicated to maintaining Basic Four equipment. The jolt came in the statement that hardware from Basic Four, a third-tier midrange supplier ($334 million in 1987), represented about 25% of Sorbus' business. And Sorbus is the market share leader among the independents!

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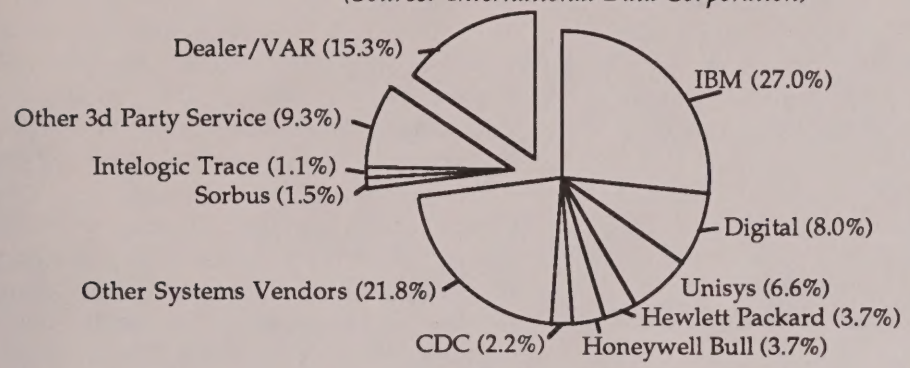
Market Shares of the 1986 U.S. Hardware Maintenance Market

(Source: International Data Corporation)



TOTAL: $13.7 Billion

Nevertheless, forces have been converging that are already changing the contours and direction of the maintenance market. For one thing, hardware reliability has improved to the point where it is difficult to justify high service contracts for newer products. Recognizing this, Digital turned the inevitable into a marketing initiative by inventing the full-year warranty.

Nevertheless, many systems vendors have had to maintain roughly the same level of support, no matter how often it is now needed or how much customers pay for its availability. The result is pressure on the profit level. For example, the operating profit margin on Digital's product sales (hardware and software) for the past six months is markedly *better* than on its service side (43% vs. 38%) — and that's subtracting all R&D as well as the cost of sales from the product sales column, counting the "service and other revenues" column as entirely service, and ignoring the portion of hardware sales that's assigned to the service column to make up for the full-year warranties.

But the most significant factor in the computer maintenance industry today may be the downsizing momentum that is now creating higher growth rates for PCs and small-scale systems than for large- and medium-scale systems. The 9% overall 1987-1991 growth is simply the average of four different dynamics.

The smallest growth is expected in the large-scale service market, where IDC projects a 4% average annual growth 1987-1991. Mainframe maintenance is typically expensive, onsite, dominated by IBM and the other system manufacturers, and yoked to a lumbering ox of a market.

Midrange growth for the maintenance market is a bit beefier, at 8% for medium-scale systems and 8.5% for small-scale systems. The smaller the system, the higher the likelihood that it can and will be serviced by an independent provider. Although manufacturers still control service for over 85% of even the small-scale installed base, the independents have established a beachhead that is applying pricing pressure on service for this fast-growing market.

So where does the 9% average come from? Maintenance of PCs, for which IDC projects a 13% CAGR for 1987-1991. The key variable here is the channel of distribution; only half of PC users turn to the hardware manufacturer, while most of the others go back to the dealer or VAR. The only impressive growth in the service industry is now concentrated in an arena where the traditional heavyweights in the market have less and less maneuvering room.

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• **WHEN IN DOUBT, REORGANIZE.** On January 28, IBM announced a massive reorganization ostensibly designed to remove bureaucratic impediments to product planning and introductions. John Akers has delegated (completely voluntarily?) control of products and marketing. Two vice chairmen of the board, K.V. Cassani and Jack Kuehler, were appointed; Cassani retains control of international marketing, while Kuehler is charged with U.S. business.

Kuehler's aide-de-camp is Terry Lautenbach, the senior vice president and general manager of IBM United States. Reporting directly to Lautenbach are six organizations: Enterprise Systems under Carl Conti (S/370, down to and including 9370s); Application Business Systems under Steve Schwartz (S/3X); Personal Systems under George Conrades (including the Entry Systems' PCs); Communications Systems under Ellen Hancock; Technology Products (chips and packaging); and the Marketing and Services Group under Ed Lucente, which keeps the Application Systems Division but loses check-off rights on new products.

Winners in the reorganization: Lautenbach, Hancock, Schwartz, and in general younger managers who will be given more authority in the shakeup. In general, the ability of IBM to plan more creatively and react more flexibly. Losers in the reorganization: Lucente, possibly Akers. And, all too probably, the ability of IBM to integrate and coordinate its disparate product lines. Ironically, the response of IBM to its problems of the late 1980s is to return to the semi-independent business units of the late 1970s, which, it can be argued, were heavily responsible for creating the problems in the first place.

• **HOW BIG A MAC ATTACK FOR DEC?** First Ken Olsen overcame a reported distaste for transcontinental flights long enough to appear at Macworld, and then John Sculley returned the favor by appearing at a DEC press conference in Boston. The occasion both times was a joint development agreement to link the Macintosh and Appletalk with the VAX and DECnet. Apple gets Digital's invite to join it in the new-boys' club in corporate America, while Digital gets closer ties to the only alternative to Microsofted PCs (something its own faltering PC efforts have left it in need of). Digital, though, bundled the announcement with a wider Network Applications Support that will provide access to DECnet services for Macs, PCs running MS-DOS or OS/2, and Unix (but Digital's Ultrix only, at least for now) as well as VMS.

• **MORE (AND LESS) TOWER POWER FROM NCR.** There are four new 32-bit Towers from NCR: the high-end 850 (up to 512 connections, or reportedly 200-300 concurrent users in real-world environments), the 650 (64 connections), the 450 (32 connections), and the 200, a new 68020 entry point maxing at 4 users. NCR marketers argue that no matter how the impending server wars turn out, they are well positioned as the major Motorola player for multiuser Unix systems in corporate America, and as an experienced PC player primed to exploit the Microsoft potential of the Intel 80386.

• **MORE AFFORDABLE OLTP FROM STRATUS.** New low-end systems from Stratus, the XA2000 models 50 and 70, are claimed to give respectively up to 10 and 12 ET-1 transactions per second at $8K/transaction/second.

• **OLD BOYS NETWORK.** Microsoft protected itself by licensing to Ashton-Tate an SQL server from Sybase. Some thought that the move was directed at IBM's extended edition of OS/2, but a more likely target would be midrange-based DBMS programs from the likes of Oracle.

• **NEW EDITOR FOR *GRAY SHEET* IMMINENT.** We wish no finer leave-taking than the final words of *Tristram Shandy:* L-d! said my mother, what is all this story about? — A Cock and a Bull, said *Yorick* — and one of the best of its kind, I ever heard.

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Though the International Market Still Means a Fistful of Dollars, Real Growth is Fuzzy After Currency Conversions

The fates of the trade balance, currency exchange rates, and stock market have been closely intertwined ever since the October crash. At this writing there is finally some evidence that the dollar's fourth-quarter freefall may have actually accomplished something like what it was supposed to, if the higher exports and lower imports that led to a diminished trade imbalance for November can indeed be partially ascribed to the currency differentials.

But in some segments of the economy, exports have been strong all along, while imports have not to date played a dominant role. The most significant of these has probably been the computer industry. As a result, U.S. computer vendors have been the beneficiary of two bequests: continued international growth, and the right to convert that growth into depreciated dollars.

What that means in cold cash can be suggested by IBM's newly announced financial results. For the year, Big Blue's revenue grew only 5.8% over 1986 — but by its own reckoning, without the increment from currency translation IBM's revenue would have been *down* 1% for 1987. Moreover, instead of growing 9.8% over 1986, IBM's net income would have decreased 3%.

No other vendor provides this kind of data, but some extrapolations are possible from the financial results of two companies that have released U.S./international information for at least a significant portion of 1987. Tandem and Digital are companies that have done exceptionally well in 1987, even granting the below-expectations 4Q results for Tandem (revenue up only 17.5%, income down 12.5%).

The important point is that this trivial (for Tandem) gain was due entirely to international business, which contributed 50% of the company's 4Q revenue. Indeed, both vendors have seen much stronger growth in international than in U.S. revenue. Both have seen a heavy inflation of international results by currency conversion. And both would probably have seen international growth at a rate only somewhat higher than the U.S. rate if the dollar were held steady.

Tandem has just released its annual report for the fiscal year that ended September 30. Overall revenue growth was 35%. Broken out by geographic segments, the revenue boost in the U.S. was 27%, and 47% for international sales (46% for Europe, and 50% for the Americas/Pacific division). In two years the international share of total Tandem revenue moved from 33% of the total to 43%.

But how much of this FY1987 expansion was fed by currency translation rather than real demand-driven growth? The easiest way to tell would be to subtract the appreciation of relevant currencies against the dollar during the period. As the *Gray Sheet* has noted before (Vol. 23, No. 9, September 11, 1987), there are

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problems with doing this, since to do it right one would have to be privy to information that only a company's accountants would know: the distribution of its sales by country on virtually a daily basis, and the savviness of its gnomes in timing the conversions. However, absent that information, the easiest way to tell is also the only way.

In Tandem's case, the European part of the puzzle is fairly simple if the ECU basket of currencies is used. During the October 1986-September 1987 period, the ECU appreciated an average of about 18% against the dollar compared to the average during the comparable 12-month period a year earlier. This would suggest that real growth for Tandem in the European market during its FY1987 was actually around 23% rather than 46% — certainly respectable, although a little below the U.S. growth rate.

A comparable figure for the Americas/Pacific division requires a lot more guesswork, since it mixes a currency with very high appreciation against the dollar (the Japanese yen) with a number of currencies that have much lower appreciation rates, like the Australian and Canadian dollars, and others that have actually depreciated, like the Mexican peso.

Divvying up the division's revenue between the different classes of currency is further complicated by the fact that Tandem has only recently become a force to contend with in the Japanese market. For example, it has just snatched from under the noses of IBM Japan and Nihon DEC a major OLTP distributed processing contract with Japan's leading dairy products manufacturer to coordinate milk distribution.

After trying to balance all these factors, the *Gray Sheet* came up with an average currency appreciation rate of about 8.5% for this part of Tandem's balance sheet, but wouldn't want to have to defend its veracity on Judgment Day. Still, unless someone out there has a better number, let's use it in lieu of sitting on our hands. This would suggest a real (non-currency-inflated) growth rate for the Americas/Pacific division of about 38.5%.

Putting the two segments together would then yield a growth rate for Tandem's FY1987 international revenue in real, non-currency-fed terms of about 28% rather than 47% — a nick above the U.S. rate, so that overall revenue growth would have evened out at 27% rather than the reported 35%.

Four months ago (in the September 11, 1987 issue), the *Gray Sheet* went through a somewhat comparable exercise in analyzing Digital's international growth vs. its much less spectacular 12% expansion in the U.S. during the fiscal year that ended June 30. In conjunction with the announcement of its financial results for 4Q1987 (calendar), Digital stated that the international share of its revenue for the quarter and the previous six months had been 49%. This clue permits a guesstimate about Digital's calendar year 1987 U.S. vs. international growth over 1986.

Guesstimate is the operative term here, since the different segments (both U.S. and international) of the revenue pie have to be calendarized from the fiscal year figures. Otherwise the process is similar to that outlined above for Tandem, except that Digital results would include the heavy appreciation of European currencies and the yen against the dollar in the last quarter.

The first cut has to establish customer revenue by geographic segment in calendar year 1987. The *Gray Sheet* estimates that the 23.5% revenue growth registered in 1987 can be broken down roughly as follows: 13% growth in the U.S., 38% in Europe, and 33% in the Canada/Far East/Americas division, for an overall international growth of 37%. International revenue for the year would represent 48.5% of the worldwide total, compared to 44% in 1986.

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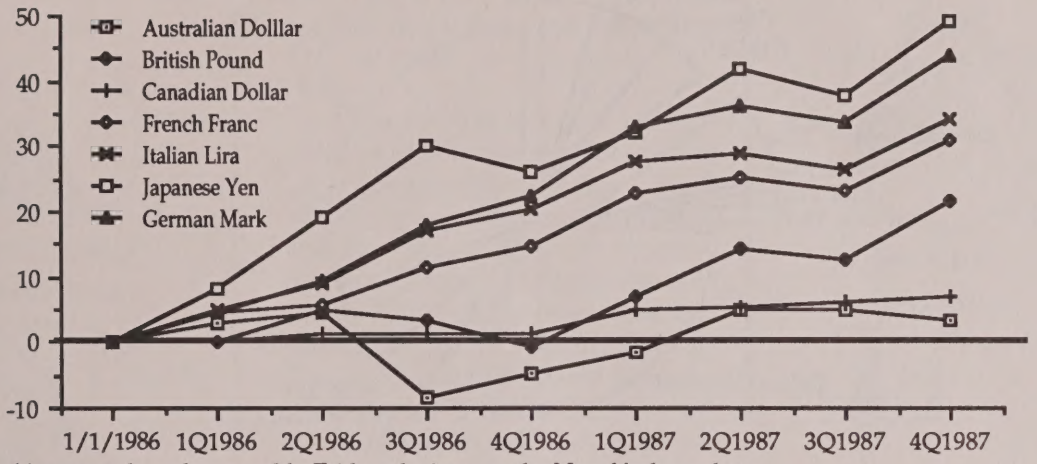
Average Quarterly Percentage Change in Seven Major Trade Partner Currencies Against the U.S. Dollar Since 1/1/1986*

(Source: International Data Corporation, 1988)



*Averages based on weekly Friday closings on the New York market.

The next cut would attempt again to eliminate the international growth attributable to currency conversions. The ***Gray Sheet*** guesstimate (again with a stronger foundation for the European market) would be 18% real growth in Europe and 23% for the Canada/Far East/Americas group, for a real constant-dollar growth of 19% internationally. This is several percentage points better than U.S. growth, and would yield a worldwide real growth rate of 16%.

Does this lower real growth rate, more nearly equivalent to the U.S. figure, really matter? Not in paying today's bills or dividends, since in the U.S. at least a dollar is still a dollar, no matter how or where it was earned and no matter what the currency speculators think about it. But it does matter in the long run, since currency conversion is a notorious Indian giver.

The only revenue growth that a vendor can depend on to help generate future sales is the kind that comes from expanding demand and an expanding base of customers. In real terms, for most U.S.-based vendors international markets do seem to be growing faster than the U.S. market, but not so fast that they can be viewed as a panacea for current or future slackness at home.

Despite Everything, U.S. is Still the Hub

The significance of the currency appreciation increment to U.S.-based vendors' international revenue is underscored by two facts of life in the computer industry: although the U.S. market remains far and away the world's largest, foreign systems vendors continue to find it difficult to find much running room here; while in the faster growing international markets, only U.S. vendors are truly worldwide competitors.

For the second consecutive year, IDC has pooled the resources of its worldwide offices, which conduct research in 21 countries, to create an overview of the total market for computer hardware outside the Eastern Bloc. Due to the complexity of the task, it is possible only to present data as of the end of 1986. However, as the ***Gray Sheet*** noted a year ago when reporting the 1985 data (Vol. 22, No, 16, December 16, 1986), the larger trends do not change dramatically from year to year.

From the facts and figures in IDC's 1986 ***Worldwide Processor Market Data Book***, the

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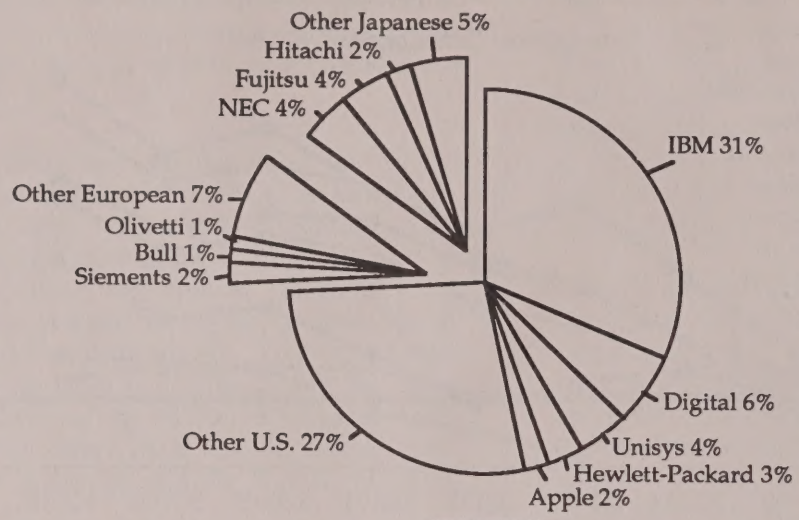
All Vendor's Shares of the Worldwide Systems Market, 1986

(Source: International Data Corporation, 1988)



$88.75 Billion

following are especially germane to the issues under discussion:

- The worldwide systems market approached $89 billion in 1986, some 37% larger than if measured by shipments from U.S.-based vendors.

- The U.S. market comprised 44% of the total — 38% for large-scale systems, 46% for medium-scale, 40% for small-scale, and 50% for PCs.

- On the other hand, U.S.-based *vendors* accounted for 73% of the value of worldwide shipments, ranging from a high of 80% of medium-scale shipment value to a low of 64% of small-scale. U.S.-based vendors shipped 72% of the value of large-scale shipments and 75% of PCs.

- Although IBM's market share is visibly eroding, it still controlled 31% of the worldwide systems market in 1986. Other large chunks of the pie were consumed by Digital (6%) and Unisys (4%). The only foreign vendors with comparable market shares were the Japanese giants (NEC and Fujitsu also each took 4% of the pie).

There are two caveats in interpreting these figures:

First off, international sales have been converted to U.S. dollars based on standard weighted average exchange rates. This tends to overstate the worldwide growth as experienced by foreign vendors, since 1986 was the first full year of the falling dollar. If both Nihon DEC and Fujitsu made 70 million yen sales in Tokyo, both results would be converted to depreciated dollars in these data, but only Digital got to spend those extra dollars.

That's one reason why the bottom lines at Digital and Fujitsu looked so different in 1986. However, the centrality of U.S. vendors and the requirement to find a common currency denominator to compare market shares dictate the use of dollars.

The second caveat is more troublesome, since it could arguably lead to an overstatement of the dominance of U.S. vendors. System shipment value is assigned to the vendor that made the sale, without taking into consideration OEM relationships or actual production site. Thus Hitachi and NEC mainframes sold worldwide by NAS and Honeywell Bull respectively

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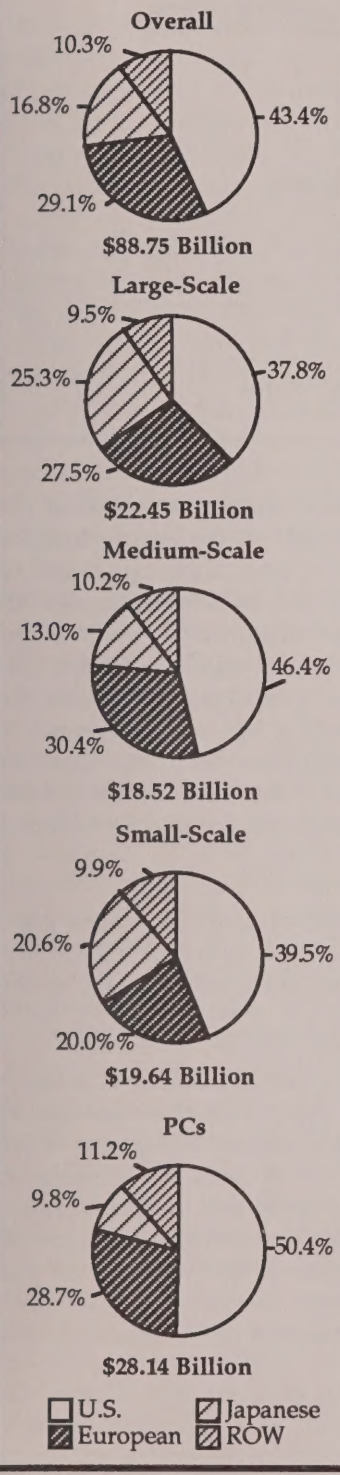
1986 Worldwide Processor Market By Product Destination
(Source: IDC, 1988)



would count as U.S. shipments, as would the myriad of PCs built somewhere in the Pacific rim but sold by a Unisys or Leading Edge. Similarly, a PC built by IBM Japan for sale in China would count as a U.S. international shipment.

A corollary is that it is the *system* that counts, not the provenance of its components or peripherals. It would be impossible to unscramble the eggs to subtract the value of Korean keyboards or Japanese disk drives from U.S. systems sales, and of dubious utility. The system vendor is the one that counts for overall control of the relationship and, especially for multiuser systems, for future hardware, software, and service revenue.

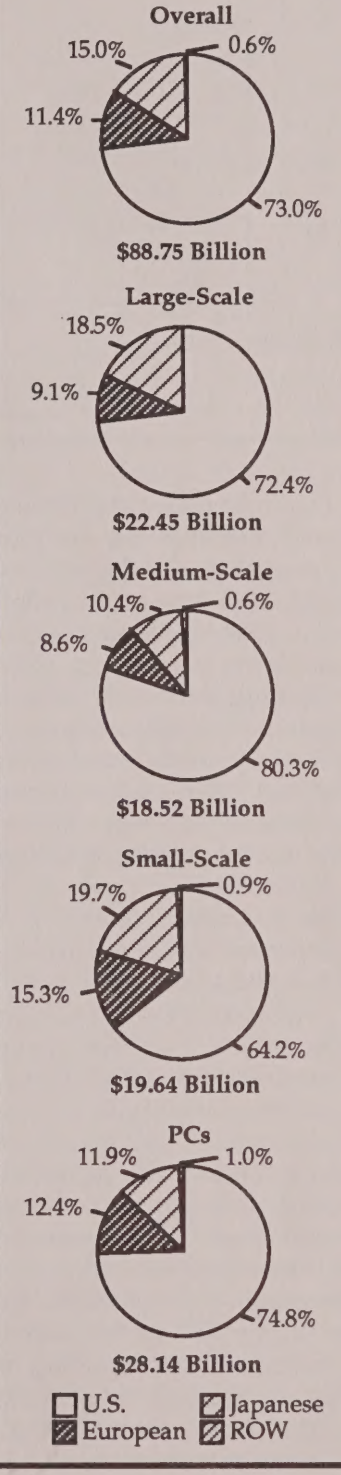
Still, the important thing to note here is that other definitions would yield markedly different data, although not so different that the U.S. would cease to be the hub of the information processing universe.

The key is that, generally speaking, only U.S. vendors are truly international to a significant degree. In Europe, for example, U.S.-based vendors reap 63% of shipment value, from a low of 53% of PC value to 69% for large-scale systems and 74% of medium-scale. The overall Japanese share in Europe is 1%. Also, while the European market may be nearly 30% of the worldwide, European vendors account for only 11% of the value of worldwide computer shipments, and manage to service only 36% of the European market.

Even within Europe, vendors are only somewhat international. Each builds a base on its home turf (Olivetti in Italy, Bull in France,

continued on page 6

1986 Worldwide Processor Market By Vendor Origin
(Source: IDC, 1988)



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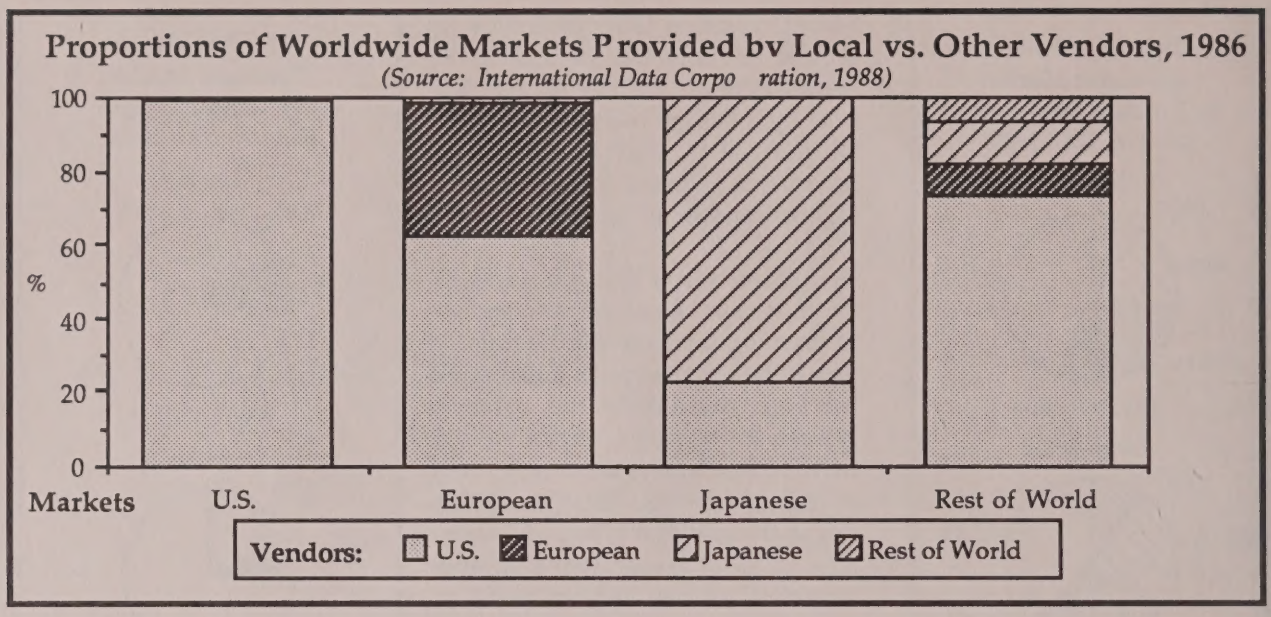

etc.), often facilitated by national government/industry ties that are far tighter than in the U.S., even during a Republican administration. Outside of its own pond, each is as much a foreign intruder as IBM or Digital. And if European customers buy foreign, they are more apt to buy leading American than from other EEC countries. This helps to explain why IBM had a 31% share of the total European hardware market in 1986, and why the value of DEC shipments in both midrange categories exceeded the total of any single European vendor.

The Japanese situation is rather different. The Japanese shares as a market for worldwide vendors and as a vendor to worldwide markets are roughly equivalent at 17% and 15%, respectively. In fact, if OEMed systems were counted as Japanese exports, the figures probably would be even more congruent.

As a market, the Japanese islands are indeed, as U.S. companies and trade officials complain, more impervious to foreign penetration than any other major destination of computer goods — except for the U.S. Japanese vendors supply 78% of the national systems market, fueled by overwhelming majorities for PCs (89%) and small-scale systems (86.5%). Still, the other 22% is entirely U.S., ranging up to 32% for large-scale systems.

The rest of the non-Soviet bloc (10% of the worldwide systems market) should presumably be fair game for everyone, although much of the Canadian market would have to be conceded to U.S. vendors ab initio. Local vendors control 6% of the market in these countries (the only noticeable impact that vendors outside the U.S., Europe, and Japan had on the market in 1986). As for the rest, European and Japanese vendors do make their best showings away from the comforts of home, with 8% and 12% shares, respectively.

But they're not the only ones to make a good showing: U.S.-based vendors accounted for 74% of the value of shipments to this segment of the market.

"The world is so full of a number of things," R.L. Stevenson told us, "I'm sure we should all be as happy as kings." Maybe so, but one of the things the world is full of is wide disparities in worldwide market shares and exchange rates. As long as a currency conversion increment is added to their already hefty share of the worldwide processor market, it's the U.S.-based vendors who have a better chance to live like kings.

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Sun Gets the Right Number From AT&T

The most intriguing story of 1988 so far is the announcement that AT&T can acquire up to 20% of Sun. Even though its own computer business is still lagging, AT&T now owns chunks of two of the most dynamic computer manufacturers of recent years — Sun and Olivetti.

Three-quarters of AT&T's possible stake would be additional capital for Sun in the form of newly issued common stock to be released to AT&T over the next three years on a schedule to be set by Sun. Priced at a 25% premium, the stock will likely raise at least $250 million. The other 5% in AT&T's investment will be purchased on the open market. A seat on Sun's board of directors will go to Vittorio Cassoni, president of AT&T's Data Systems Group.

For Sun, the deal represents a $250 million cash reserve that it can tap at will. The fact that Sun controls the pace (ergo price) is critical here.

Two somewhat analogous deals — IBM's investments in Intel (now ended) and MCI — occurred at points when the smaller companies were obviously strapped for cash. While Sun is not in such dire straits, there are reasons (including statements by Sun's Scott McNealy) to expect mini-crunches in the future. Costs for the SPARC chip have been high, while the 80386-based workstations expected from Sun in May will lead to new marketing initiatives in commercial processing. Sun can now choose when to dip into Ma Bell's purse for cash in exchange for stock over whose price it can exert a large measure of control.

It's not clear what else AT&T brings to Sun, except additional insurance on the future of Unix. Sun has achieved its enviable momentum in part because of its association with Unix standards; an even closer relationship with AT&T, which still tries to position itself as the keeper of the keys to standard Unix, can only serve to buttress Sun's position.

Sun may also get a dollop of grease for its commercial market wheels from the deal. While AT&T hasn't exactly been a high-flyer in the market, Sun could benefit if its new stockholder included it in projects integrating computers and telecommunications and in government and systems integration bids.

One area where there is a possibility of gain for Sun, but also of loss and, the *Gray Sheet* believes, the likelihood of a Mexican standoff, is industry acceptance of Sun's SPARC chip. Sun would like to lure more vendors to endorse its RISC implementation as AT&T, Xerox, and Arete have. Additional backing from AT&T may be a positive sign for some, but others may back off from a situation where they would be competing against both the company that developed the chip and with the company that owns 20% of the developer.

A potential benefit for Sun cited by some commentators — an improvement in Sun's image as an impudent adolescent now that Ma Bell has moved in — seems to the *Gray Sheet* to misread the situation. In the computer biz, Sun's image requires little burnishing. Even its failures underscore its new market position. After all, how often have competitors of the caliber of Apollo, Digital, and HP joined forces to support a standard (X Window) at least in part because it was *not* a Sun product?

Moreover, a company that may have been perceived a year or so ago as an uppity upstart startup has now received an imprimatur from people much higher up in the hierarchy of worldwide capitalism than the former phone company: to wit, the folks on Wall Street who not only buy Sun stock, but buy Sun workstations as well. If anything, AT&T is the company whose reputation is enhanced by the deal.

AT&T in fact gets several things from its partial ownership, starting with oversight

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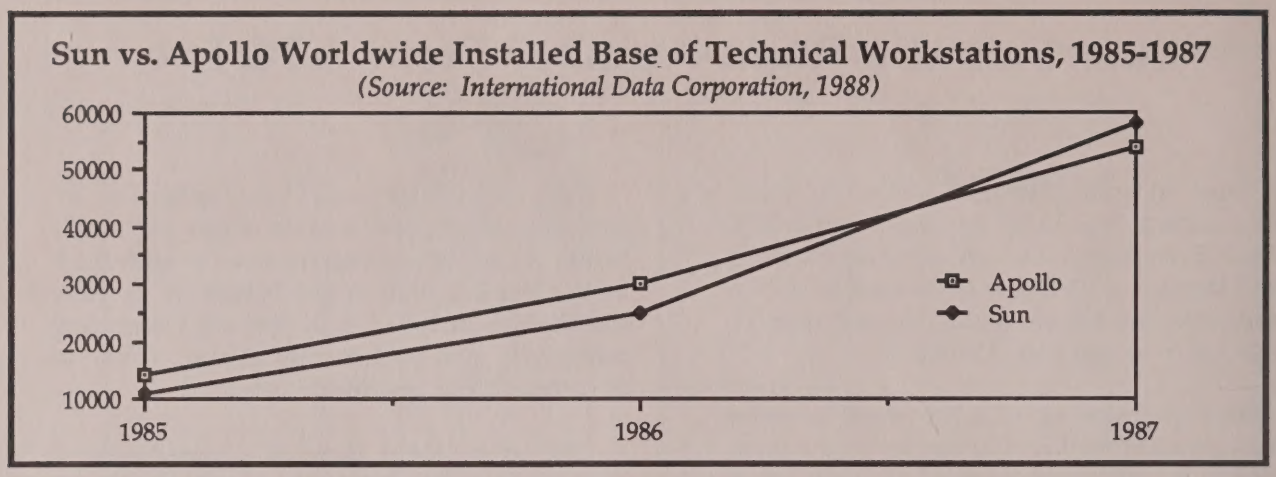

over its investment in Sun's SPARC technology. There are some chicken-and-egg questions here, though — which came first (if not in time, then in valuation), AT&T wanting SPARC technology or wanting a piece of Sun?

Some eyebrows were raised at the joint Sun-AT&T announcement last October, not so much because AT&T was looking outside of Bell Labs for future nonworkstation products as because AT&T was paying so much for RISC-based SPARC technology (official OEM prices are presumably industry-standard, but AT&T is also doing things like assigning around 100 engineers to the Applications Binary Interface for Unix on the SPARC chip).

One story that IDC has heard helps put this in perspective. Supposedly the discussions between AT&T and Sun about partial ownership began more or less in tandem with the final phases of the SPARC negotiations. It was AT&T that broached the possibility and started waving its checkbook, while Sun was playing hard-to-get. AT&T's munificence with ABI support can therefore be partially explained as an enticement during the company's pursuit of Sun.

But only partially, since in the area of Unix standards the interests of Sun and AT&T are complementary. Because both have been standardbearers, it behooves both to keep in step with one another. Just as Sun has an interest in ensuring that AT&T doesn't go off in completely different directions with key aspects of Unix (networking, windowing, etc.), AT&T has an interest in keeping track of Sun's "open-architecture" standards ventures, particularly now that Posix, X/Open, and midscale competitors like Digital have shown their interest in establishing a Unix standard independent of a particular vendor.

AT&T may not actually want to monopolize the Unix market (and couldn't if it did), but it apparently does want to keep control of the standard so that it can eventually leverage its position as a source of the Unix operating system to sell total integrated computer/telecommunications solutions. It can live with — in fact requires — a plethora of independent Unix systems vendors to expand the market, but cannot live with totally independent sources of Unix standards. It "supports" Posix, has joined X/Open, — and has bought into Sun.

The obverse is that the multiuser system and workstation competitors of AT&T and Sun have more reason than ever to feel concerned about the advantages that the two could reap from de facto control of supposedly "open" Unix. On January 19, leading figures at 12 companies, including the CEOs of Apollo, Prime, HP, and Tandem, sent a telegram to AT&T's James Olson expressing the "concern within our companies and our customers regarding the future of Unix as an open standard." They are requesting Olson to have Vittorio Cassoni, head of the AT&T computer division, sit down with their Unix managers sometime during the week of January 25 to clear the air before UniForum.

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Yesterday, Today, and Tomorrow: The Top Ten Stories of 1987 — and 1988

The year now slipping away has been one that dwelt in possibility. There were no revolutions in the computer industry, but a number of possible revolutions — events and trends fraught with the possibility for major transformations, if vendors are able to exploit them and users choose to implement them.

Every year, of course, sees promises made that may or may not be fulfilled. In 1986, one much-ballyhooed promise was the 9370 — IBM's "VAXkiller," as some of its developers were unwisely quoted as calling the new entry-level S/370 family.

The *Gray Sheet*, though, opted not to incorporate the 9370 announcement in its annual listing of the leading events and trends of the year, except as a symbol of "Problems at virtually every level of IBM's line of computer systems," the top story of 1986 (Vol. 22, No. 17, December 22, 1986). This decision was based principally on IDC doubts about the 9370's appeal except for a limited degree of distributed processing in a few large corporate accounts, and as an upgrade from low-performance 43XX systems. In this regard, the noninclusion of the 9370 as a top story of 1986 proved one of the best predictions for 1987 in last year's compilation.

But this time, several promises cry out for a place on the list. They have broader implications, and are already here at least to some extent, even if their full significance has yet to unfold.

The in-betweenness of so many of this year's choices dictates a slightly different approach to the annual *Gray Sheet* wrapup issue. In a double-jointed double issue, the *Gray Sheet's* choice of the Top Ten Stories of 1987 will first be discussed. Then the perspective broadens to enumerate ten top stories of 1988 and beyond — the context in which the choices were made.

First, Janus looks back on 1987's Top Ten, as usual drawn up after consultation with IDC analysts, followed by quiet meditation in Plato's cave:

Gray Sheet's Top Ten Stories of 1987

1. The announcement of Systems Application Architecture by IBM
2. The PS/2
3. The ability of Compaq, Apple, and others to compete successfully in the PC market despite the PS/2
4. Acceleration of the merger movement in the software industry and its spread to the communications sector
5. The moderate industry rebound from the Great Softness
6. Digital's continued sales performance and its MicroVAX 3000 insurance policy
7. Increased momentum for Unix
8. Despite new midrange and "distributed processing" strategies, IBM's continuing revenue and profit problems
9. OS/2 and the Microsoft hegemony
10. Intensification of the U.S.-Japan high technology trade war

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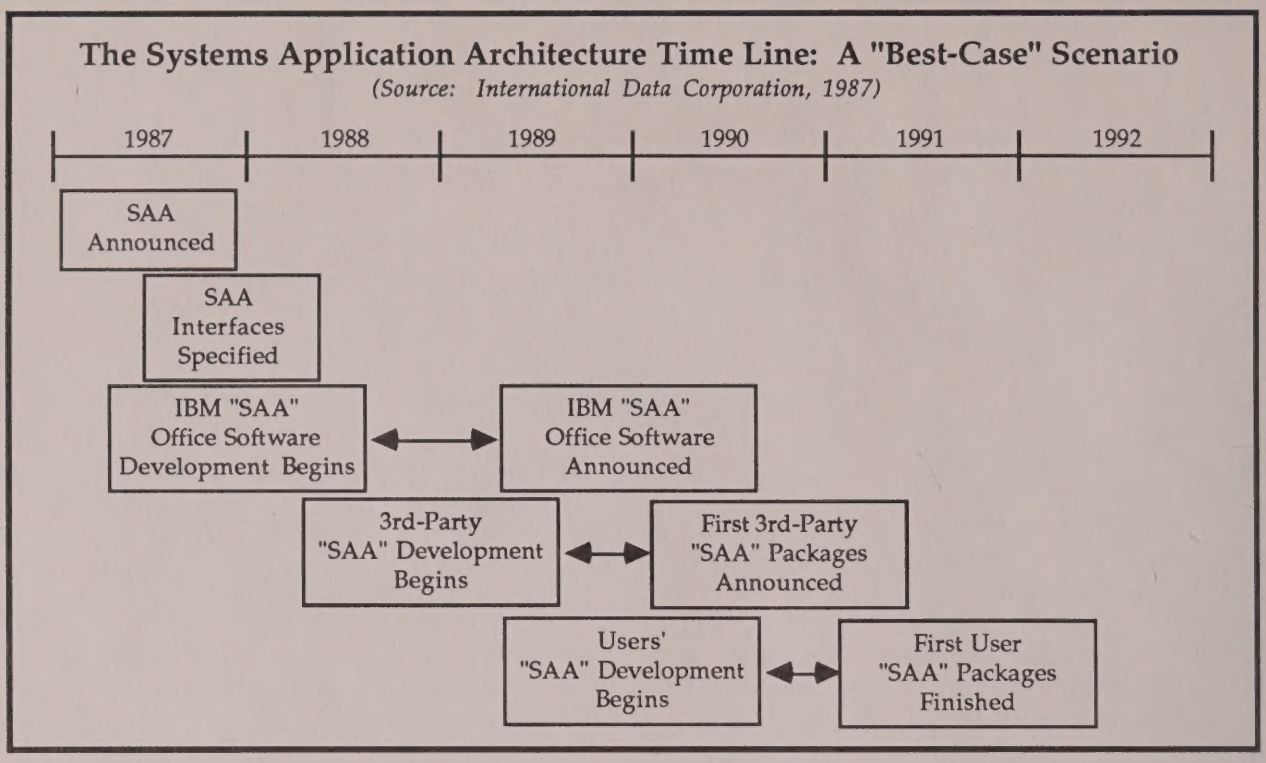

1. The announcement of Systems Application Architecture by IBM

Once again, IBM is the principal issuer of promissory notes. In fact, 1987 has been, in *Computerworld*'s phrase, IBM's Year of Promises. While a significant portion of its base has been dancing around the Golden Calf cast by the high priests of "One Vendor, One Architecture, One Network," IBM has had to come down from its mountain bearing not commandments ("Thou shalt have no other gods before me" doesn't cut it any more) but promises of future products and directions.

Among these promises, Systems Application Architecture (SAA) is the most significant. IBM indicated in its St. Patrick's Day announcement that SAA would be similar to SNA in its gradual implementation and, by implication, in its long-term importance. One doesn't have to accept the marketing hype to recognize that, in its potential impact on IBM's huge user base, SAA is the most significant revolution to be unleashed in 1987, and that win or lose it qualifies as a bona fide Number One story of the year.

SAA is supposed to be the glue that will bind applications across IBM's incompatible architectures (S/370, S/3X, and PCs and PS/2s capable of running OS/2). The three components will be common user access (a uniform end-user interface, of which a major element will be the Presentation Manager in OS/2), a common programming interface (portability plus other interarchitecture hooks with standard languages, standard program design aids, SQL database interface, etc.), and a common communications support (essentially the elements outlined in IBM's September 1986 Open Communications Architecture announcement).

Ideally the job of application programmers (though not system programmers) would be much easier, since they would be working with the SAA layers common to all of IBM's major architectures. Even if it doesn't quite reach the ideal, SAA could nevertheless help check the dreaded Software Backlog monster.

Not coincidentally, SAA would also help out IBM's own programmers as they attempt to add more compelling software products to bol-

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ster hardware sales and overall revenue. Given Digital's success with All-in-1, it is instructive that IBM's first major SAA project will be a new integrated office product to replace PROFS, DISOSS, et al. The linchpin of IBM's SAA-cum-software initiative will be the new Application Systems Division (ASD), which will oversee internal development and coordinate ISV alliances.

We are not talking about storming the Bastille; this revolution by necessity will be piecemeal. For example, IBM has preannounced that RPG will be part of SAA, but can't officially announce it due to a policy requiring that SAA components be deliverable as well-defined products within two years.

Even for what has been announced to date, SAA implementation will be slow. While ASD may succeed as ramrod for IBM internal compliance, SAA's long-term position depends on third-party software vendors and users writing to its standard conventions rather than to the operating system. Some ISVs may decide that due to possible performance degradation for applications written to SAA, they would be in a more competitive position by sticking with the status quo ante. Many users meanwhile will want to see some real SAA programs (especially IBM's promised office software) before they begin to select which internally developed applications to rewrite for the new environment.

Nevertheless, by the mid-1990s SAA will probably be playing a lead role in worldwide MIS shops, especially the true- and mostly-blue. In that context, SAA is not so much an answer to DEC as IBM's response to what IDC calls second-generation computer systems (see p. 9).

2. The PS/2

Don Juan had fun with the double standard. Apple did too, once the Macintosh began flooding into corporate computing environments and Apple was able to sustain both an Apple II and a Mac standard. Now IBM is trying to create a double standard for IBM PC-compatibility: the PS/2 from IBM, and everything else from everybody else.

Or even a triple standard, since the PS/2 family breaks into two groups, depending on whether the changes from earlier PC-compatibility are hardware only, or hardware plus software.

On the hardware side, custom chips, 16-bit data paths for 8086 boxes, new graphics subsystems, and 3.5" diskettes mark some of the critical differences from (not to mention improvements over) the standard before April 2. From this perspective, the PS/2-25 and 30 can be considered PC and XT replacements, the 50 and 60 AT replacements, and the 80 IBM's riposte to the extensions of AT-class PCs with 386 chips.

The three AT-replacement PS/2s (286- and 386-based) permit an even bigger jump from PC-compatibility as we knew it. At this point the improvements of the proprietary Micro Channel over the AT bus are esoteric, but there have been broad hints that it will accommodate OS/2 more efficiently than its predecessor. Even if Compaq is right and there are no meaningful differences between OS/2 on a PS/2 and OS/2 on a good traditional compatible, the PS/2s would still represent a significant break in PC-compatibility, for they would be the primary locus of IBM's proprietary extended version of OS/2, with its SAA links to IBM multiuser systems.

For IBM's intentional bifurcation (trifurcation?) of the compatible PC market, the PS/2 is the ***Gray Sheet's*** choice as Number Two story of the year.

3. The Ability of Compaq, Apple, and Others to Compete Successfully in the PC Market Despite the PS/2

For all its implications for the PC market, though, the PS/2 was only a slightly bigger story than the boom year registered by many of IBM's competitors in personal computers. It was these rivals that fueled most of the growth in the most dynamic sector of the computer industry in 1987. *continued on page 4*

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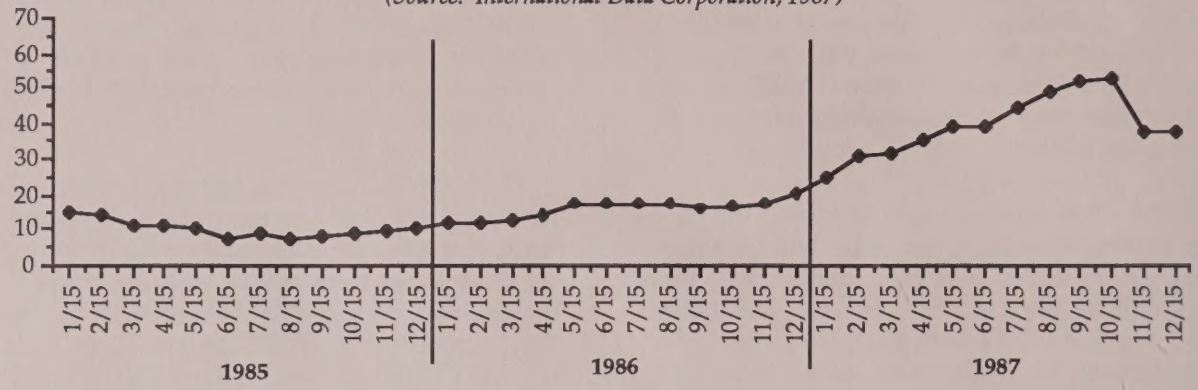
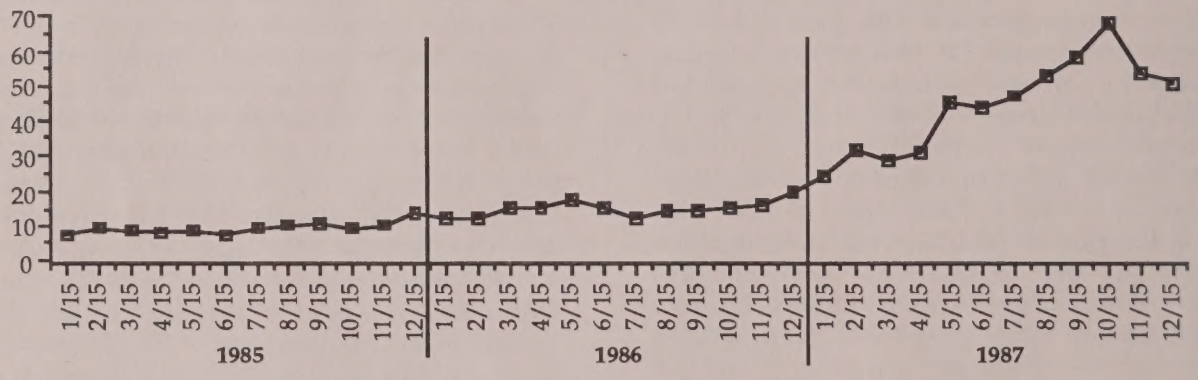
Value of Apple Stock at Midmonth, January 1985 - December 1987
(Adjusted for 1987 2-for-1 Stock Split)
(Source: International Data Corporation, 1987)



Value of Compaq Stock at Midmonth, January 1985 - December 1987
(Source: International Data Corporation, 1987)



While a few manufacturers (e.g., Kaypro) got the pointed end of the cornucopia instead, a number of PC vendors shared in the largesse. But two stood out above the rest: Apple and Compaq.

In the year that Apple shipped its millionth Mac, it also reinvigorated the line with the Macintosh SE and the Mac II. For 1987, the SE was the more pertinent product (for example, further solidifying Apple's position in the desktop publishing market). The Mac II seems better suited for the low-end workstation than for the office environment. In any case, in 1987 there could no longer be any doubt that Apple is, except for Unix workstations, the only real alternative to IBM-compatibility in PCs for home, school, lab, or office.

Compaq's success in 1987 is if anything even more noteworthy, since it had to defend its position as the class act in traditional IBM-compatibility against the PS/2 and almost the entire cast of "MASH." The best defense is a good offense, the military textbooks say, and Rod Canion's Pattenesque forays against IBM over the past three quarters have proved it once again.

4. Acceleration of the Merger Movement in the Software Industry and its Spread to the Communications Sector

Except for the Telex-Memorex marriage, industry consolidation continued to lag in the hardware sector in 1987. There certainly was

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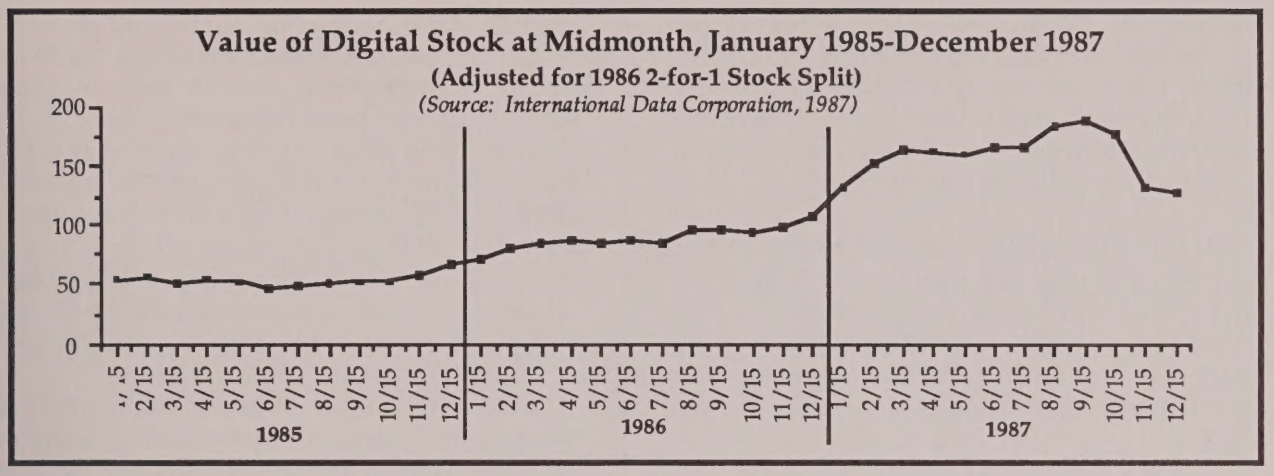

no repeat of a merger between systems vendors a la Unisys. However, the software consolidation momentum that took fifth place in the *Gray Sheet's* Top Ten for 1986 has moved up a notch this year, if only on the strength of the colossal Computer Associates-UCCEL combination. To this should be added the major data communications consolidation of the year, the merger of 3Com and Bridge.

What should be considered a major subset of this merger movement in 1987 has been the proliferation of software and communications buyouts by major computer systems vendors anxious to expand their expertise, targeted markets, and revenue. Unisys's acquisition of Timeplex falls into this category, as would Prime's purchase of Versacad in October and, should the deal go through, its acquisition of Computervision (see the story later in this issue).

5. The Moderate Industry Rebound from the Great Softness

The Great Softness was the *Gray Sheet*'s choice as the Number One story of the year in 1985, while its continuation into a second year was the Number Two story for 1986. So how come the 1987 rebound rates only a mediocre position halfway down the list of the Top Ten stories of the year? Because in terms of real industry growth, it has been only a mediocre rebound.

IDC wants to look at how the industry does in fourth quarter results before finalizing its estimation of the computer hardware market in 1987, but the 9% growth projected in earlier issues of the *Gray Sheet* still looks about right — maybe a percentage point low, but in the ballpark. Multiuser systems should be even closer to the mark, since the growth that IDC might add will likely be entirely in the PC sector. Now, 9-10% growth is obviously better than the 5% growth in 1986, but in 1985 — the first year of the Great Softness — overall growth was 9%.

Nevertheless, 1987 represented a much stronger overall showing than 1985, since the principal depressant of this year's results has been the continuing weakness of just one company — the big one that takes up 40% of the pie chart. Without IBM, growth would likely be in the 12-14% range. Now, this is good, solid growth, but even so it wouldn't qualify as a really strong rebound.

But progress is a major story, even if not an overwhelmingly significant one. Particularly auspicious has been the jump in net income for computer industry companies, especially if IBM is left out of the equation.

6. Digital's Continued Sales Performance and its MicroVAX 3000 Insurance Policy

Father, we have sinned. . . . It's confession time: this time last year the *Gray Sheet* was one of the industry observers who thought that Digital's growth would start to level off in the

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second half of 1987. The reasoning behind that prediction wasn't so much 9370 competition in itself, but a climate (partially instigated by the 9370) conducive to second thoughts about Digital's software weaknesses (commercial applications, DBMS, OLTP, etc.).

It certainly hadn't happened by the end of 3Q1987, and may not happen this quarter either. With revenue having grown 24% and income 61% through the first three-fourths of the year, Ken Olsen still looks like a Midas whose touch turns everything to gold, as long as it's not PCs.

But it can't last forever, at least if Digital's rollercoaster history can be extrapolated into the future. All of the problems that worried the *Gray Sheet* last year still exist, even if a partial OLTP solution is apparently in the offing. Digital hopes to find growth in the large-scale market with its first true mainframe alternative, but its track record outside of the midrange hasn't been all that impressive.

That's why the *Gray Sheet* would single out from Digital's record of achievements in 1987 the unveiling of the MicroVAX 3000 family. As suggested in these pages at the time of announcement (Vol. 23, No. 9, September 11, 1987), the fact that the new MicroVAX systems are an aggressive small-scale VAX entry (high performance, low price) designed for volume sales can allow a further expansion of the VAX installed base as an insurance policy against future floods and fires when Digital growth starts to stall.

7. Increased Momentum for Unix

One reason that stalling might occur is the implications of Unix success as a force in commercial processing in 1987. Among the best indices has been the detente with Unix signed by an ever-growing number of proprietary systems vendors. Prime and even Tandem came out with Unix systems in 1987, while Wang has finally clarified its Unix strategy.

Among the big boys, IBM gave statements of direction on how AIX (originally created for the RT) would become its single Unix product, while Digital intimated that Ultrix, its Unix variant, was absorbing more of the company's software development dollars than VMS. Even if, as the *Gray Sheet* suspects, much of this Ultrix expenditure in fact represents DEC's investment in X Window, which will eventually be ported to VMS as the company's windowing standard, Ultrix has been a stepchild at Digital for so long that any commitment is welcome to the Unix community.

Obviously the lure of government contracts remains the overriding factor behind many of these decisions by proprietary vendors, but it is not the only one. Commercial users are increasingly interested in the cost/performance advantages of Unix systems, as evidenced by NCR's popular Tower series. HP's success with the Unix members of the Spectrum series with some of its commercial customers while the bugs were being worked out of the new release of its proprietary operating system for the 3000 line seems to have set some wheels in motion there as well that could lead to a much-expanded role for Unix.

It hasn't hurt either that the standards issue seemed over the course of 1987 to have stabilized and even neared resolution. After AT&T joined X/Open and X/Open endorsed the emerging Posix standard, the very real fears of a year ago that the Unix standard would splinter into pieces have died down.

8. Despite New Midrange and "Distributed Processing" Strategies, IBM's Continuing Revenue and Profit Problems

SAA wasn't the only promise made by IBM in 1987. We've seen the resurrection of VM as a "strategic product" with VM/XA SP, which over the course of 1988-89 will see XA support, up to four preferred guest operating systems at supposedly 88-98% of native performance, and native SNA support. We've seen LU 6.2 incorporated into non-CICS environments under VTAM as of 1988, and CICS support added to

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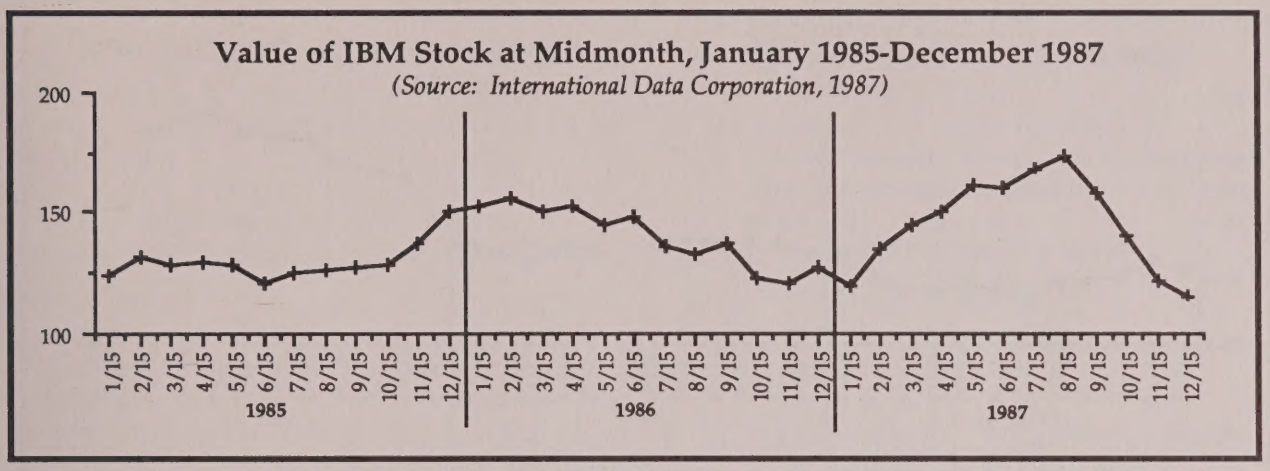

VM. We've seen NetView Release 2's first hints of combined network and system management promised for 1988.

Oh, we've seen lots of things. What we didn't see in 1987 was an abundance of sales. IBM's customers must feel good about a lot of the promises, but not good enough to buy enough now to help revenue all that much (up only 5.5% for the first three quarters of 1987) or income (down 7%).

There are few unambiguously bright spots. The PS/2 is certainly holding its own, with over a million shipments to date, but at the expense of XTs and ATs. Large-scale shipment value apparently grew, but not as fast as IBM's PCM rivals. And meanwhile the midrange bleeds.

But what of all those promises? They may augur a somewhat better 1988, but their real message is not "wait until next year," but "wait until next decade."

9. OS/2 and the Microsoft Hegemony

Like it or not, IBM is married to Bill Gates for the foreseeable future (which these days is as long as people can hope to be married anyhow). There is no new proprietary operating system for PS/2s, just a proprietary extension relevant only in large corporate accounts to an operating system that can run on any 286- or 386-based IBM-compatible PC. Moreover, a multiuser PC operating system capable of exploiting the 80386 will also come from Microsoft. Moreover, the OS/2 Presentation Manager, a key element in the user interface for SAA, will come from Microsoft.

Microsoft stockholders can breathe a sigh of relief. So can all the compatible PC manufacturers, who are assured that IBM's bifurcation of the market will not orphan the installed base of MS-DOS applications that have fueled so much of the growth of the PC industry. So can all the software vendors, including Microsoft, who can now make new revenue from rewriting MS-DOS applications to run on OS/2 better than in compatibility mode.

10. Intensification of the U.S.-Japan High Technology Trade War

Whoever in Japan thought up the Fifth Generation project must now be kicking himself, if not considering hara-kiri. While it has apparently stimulated some worthwhile supercomputer and AI research in Japan, the most significant effect to date was to panic leaders in U.S. government, the scientific establishment, and the computer industry.

The *Gray Sheet* suspects that the fear of potential Japanese high-tech superiority first stimulated by word of the ICOT project was the principal reason why the government closed ranks with the semiconductor manufacturers

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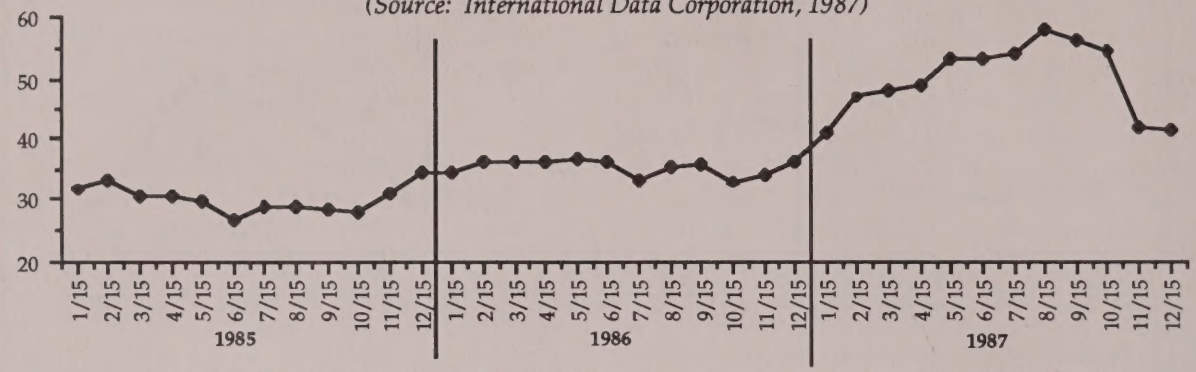
Value of an Average of 15 Computer Stocks* at Midmonth, Jan. 1985-Dec. 1987

(Source: International Data Corporation, 1987)



*Altos, Apollo, Apple (Adjusted for 1987 stock split), Compaq, Control Data, Data General, Digital (adjusted for 1986 stock split), Hewlett-Packard, IBM, NCR, Prime, Stratus, Tandem (adjusted for 1987 stock split), Burroughs-Unisys (adjusted for 1987 stock split), and Wang.

over the dumping issue in 1985, and why the tentative accord of 1986 fell apart in early 1987. Although the impact of U.S. retaliation was eventually restricted to a handful of companies and products, it represented the most serious trade imbroglio between the U.S. and an ally in recent decades.

Nor does it seem ready to dissipate, as indicated by the Defense Department's role in blocking a Fujitsu supercomputer sale to MIT. Japanese vendors are rapidly building up U.S. manufacturing capabilities to defuse the issue, but would it really have helped Fujitsu if its supercomputer had been physically constructed in Oregon if its mind and soul were made in Japan?

Honorable Mentions

Hoary tradition dictates that there be ten and only ten top anythings for a year when these lists are compiled in late December. Were it not for its veneration for Western folkways, the *Gray Sheet* would have had twelve stories in its list, to conclude with:

11. Sun's Position as Workstation Market Leader. Sun Microsystems not only surpassed Apollo in revenue in 1987, but it even exceeded Apollo's installed base of workstations (58,000 vs. 54,000). Not everything that Sun has attempted has met with resounding success (its attempt to create a windowing standard with NeWS had to backtrack in the wake of X Window), but almost everything has. That's why its SPARC chip, an attempt to create a RISC standard, has garnered so much attention.

12. The Mad Monday Stock Freefall. Putting the Wall Street implosion this low down will probably lead to some flak from colleagues at IDC, since this story tied with SAA in the number of first-place votes in the *Gray Sheet's* annual poll of analysts before the yearend issue. Undoubtedly if a young company had been considering an IPO any time soon, the market turmoil became a dominant concern. And if there is a recession, 'most everyone could suffer.

But it's too early to tell if there will be a recession. FDR was right — we have nothing to fear but fear itself, since it is the fear of recession that can create one when people stop buying. So far, the evidence is mixed.

As for the computer industry, an IDC buying intentions survey conducted after the crash asked MIS managers what the effect of recent Wall Street events would have on their spending plans for 1988. Almost three quarters said they would have no effect at all. About 10% said spending would be slightly lower as a result, and 1% said significantly lower. Then 17% said they just didn't know. Neither does the *Gray Sheet*. The jury is still out on this story.

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In the meantime, other events of 1987 are worthy of note, however cursory the mention must be. Eight other significant stories of the year were:

- The exfoliation of the Intel 80386
- Tandem's distributed SQL database management system
- The IBM-Fujitsu arbitration decision
- The X Window System
- The launching of Honeywell Bull
- The stabilization of Wang's vital signs
- The emergence of multitasking/multiuser software
- DECworld '87 (if only for sheer chutzpah)

Outlook for 1988: Second-Generation Systems Enter the Mainstream

For the last year or so, IDC has been referring to something called the second generation of information systems. In this scheme, first-generation systems, be they minis, mainframes, or whatever, are characterized by proprietary hardware and software designs that lock in customers and allow for semimonopoly pricing in many established accounts.

In contrast, second-generation information systems — beginning with PCs, but now moving up to more powerful systems — are increasingly understood in terms of both hardware and software standards. In particular, the Intel and Motorola microprocessors, as well as the DOS, Unix and (to a lesser extent) Pick operating systems, are rapidly changing the rules of the industry, freeing customers and developers and making for a much more competitive business.

History suggests that periods of technological transition are generally accompanied by accelerated shifts in market share. It is no accident that companies such as Apple, Sun and Compaq have been among the fastest growing in U.S. business history. This kind of success can only take place when timing and talent catch a big wave, in this case second-generation technology, and ride it on to the future and fortune.

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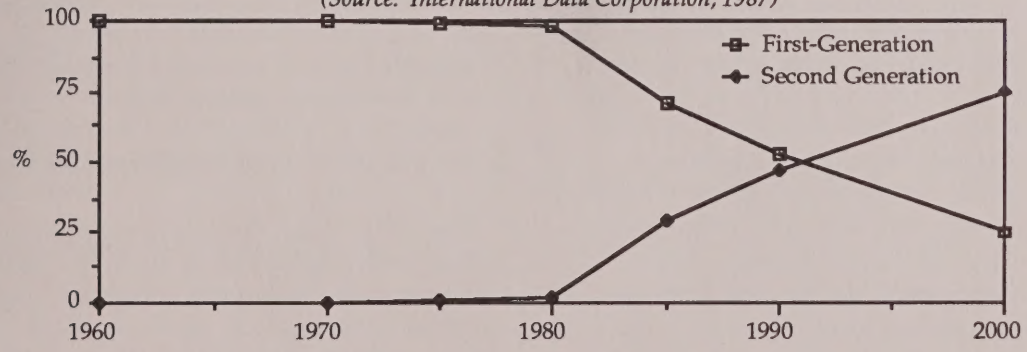
The Transition from First- to Second-Generation Information Systems, 1960-2000*

(Source: International Data Corporation, 1987)



*Based primarily on operating systems not created and/or controlled by hardware manufacturers (e.g., Unix or MS-DOS); the application environment may in fact be closer to 100% "second-generation" by 2000 if X/Open succeeds in its endeavors.

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Ten Key Directions for the Computer Industry in 1988

1. Unix momentum becomes a given
2. Changing view of standards impact
3. Fewer opportunties for first-generation success stories
4. Windowing strategies create confusion
5. RISC enters the mainstream
6. U.S. vendors maintain CPU design edge
7. First cracks in the Digital armor
8. Continued problems at IBM
9. Tandem and Sun stay on a roll
10. Pervasive use of 386

Thanks to this perspective, IDC's prognosticators did well in 1987, correctly calling many of the key developments ahead — the continued success of Digital, Tandem, Sun, Apple, and Compaq; the problems for the 9370 and IBM; the renewed enthusiasm for Unix; and the general trend toward downsizing and distributed processing architectures. But, although preeminent, the impact of second-generation systems is only one of many factors shaping the marketplace of 1988 and beyond. Forecasting therefore remains a complex mix of the fundamental and the variable.

In this second section of the annual yearend issue, the *Gray Sheet* looks ahead to 1988, highlighting ten expected directions. Selections are not in any particular order, with the exception that the general trends are explained first, followed by their implications for certain major vendors.

Unix Momentum Becomes a Given

In 1986, Unix boosters were often viewed as evangelists whose calling had passed. In 1987, they were finally listened to. In 1988, Unix acceptance will be a given.

On the technical side, Unix is winning big. Very few major contracts are being signed without Unix as a starting point, and even Digital is talking about Unix-based RISC workstations. In fact, if there is any doubt about the current potency of being associated with Unix in the technical workstation market, ask Sun — or, if you have sadistic tendencies, ask Apollo.

On the commercial side, the evidence is still sketchy and even anecdotal, but should in 1988 become much more telling. Hewlett-Packard is finding commercial demand for its Unix-based Spectrum products; Sequent is challenging the "Unix can't do transaction processing" rap.

Intel 386-based file servers will give Unix a home with local area networks, and proprietary mini and mainframe vendors will increase their commitment to Unix product development. Huge opportunities await the vendors that can use Unix to tie together PCs, offer low-cost business computing, and high volume OLTP. Even IBM might be tempted to see Unix as a painful cure to its midrange system blues.

Changing Views of Standards Impact

One of the ways that vendors have put down industry standards such as Unix has been to insist that their proprietary products have had superior functionality. Although this has in many cases been true, its effect has been to allow vendors to try to position standards as basically lowest common denominators that inhibit innovation and make all vendors look alike.

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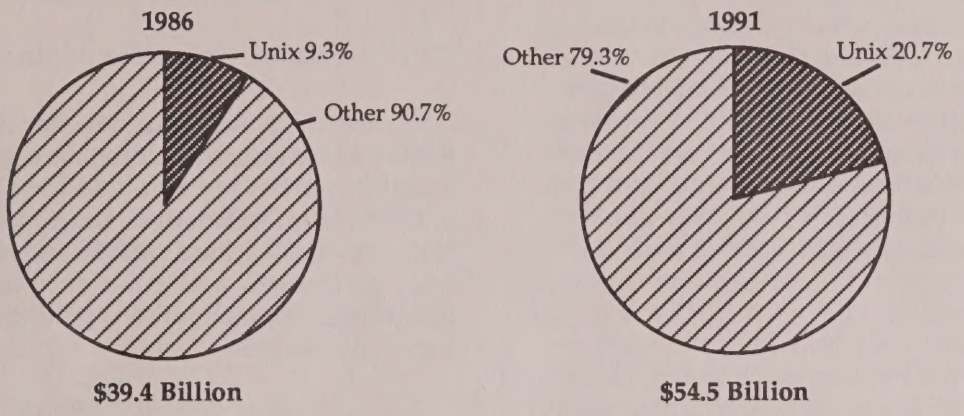
Unix Proportion of the Value of U.S. Computer Shipments, 1986 and 1991

(Source: International Data Corporation, 1987)



The personal computer has already proven this to be untrue. The basic MS-DOS standard has allowed for a market that can be called anything but homogenized. Users have come to enjoy the benefits of an almost infinite array of hardware and software options. As a result, customers get products that are often both more functional and cheaper. Rather than homogenize, the standard has made the market highly variegated.

This mentality has helped create the demand for Unix. Just as IBM could not build every feature that PC users wanted, no proprietary multiuser vendor can meet all of its customer needs. Only by rallying around a standard such as Unix can a multiuser market emerge that is big enough to support the critical mass of hardware and software talent needed to help meet diverse user needs. The point here is that Unix will not be successfully branded as a "vanilla" system; it will be adapted and tuned to a wide variety of needs.

Less Room for First-Generation Success Stories

Riding the crest of second generation technology was not the only means to success in 1987, and won't be in 1988. The growth of Digital, for example, owes little to second-generation logic. It is instead the result of first-generation competition, with Digital offering more attractive proprietary midrange solutions than its (or IBM's) traditional mini rivals. Tandem and Cray also fall into this first-generation success story camp; both have proprietary systems whose functionality is sufficiently superior to warrant significant market share gains.

Although there may be other first-generation success stories, it is clear that the window of opportunity for this strategy is nearly closed, and that the great majority of future success stories will be those companies that align themselves with second-generation technologies. It's no secret that just about all new processor startups are using either standard microprocessors, Unix, or in many cases both.

It's hard to name a single new company processor success story in recent years that didn't use Unix or DOS or an Intel or Motorola chip. Tandem may well be the last of this breed.

Windowing Strategies Create Confusion

The upcoming battle over windowing/user interface schemes is one of the more ironic aspects of the success of second-generation systems. Having made life miserable for proprietary systems, the two main standards of the day — Unix and DOS — are now making life tough on each other under the guise of Microsoft

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Windows/Presentation Manager/SAA for the DOS world and X Window for the Unix and mini buffs.

Consider Digital, which has been getting a bad rap for not supporting PCs well. One way to allay such concerns would be to aggressively support the MS/Windows effort. On the other hand, DEC for simplicity's sake wants only a single major interface for its systems, and has thus pledged to support its own superset of the X Window standard across VMS as well as Ultrix systems.

As an aside, it may have been the windowing issue that has thus far made a more formal relationship with Apple undesirable, since Digital couldn't adopt the Macintosh interface as a company standard. By letting Apple and others build Mac links to the VAX, DEC can hopefully have its cake and eat it too.

It would be nice if the industry could adopt a single graphical interface standard. In fact, there is a decent chance that it will actually happen, since some participants claim that MS/Windows and X Window can be merged. This could become one goal in X/Open's long-term project to create a uniform applications environment that might include the Microsoft Presentation Manager. There are even stories that X Window will in some respects be more similar to the Presentation Manager than Microsoft's own Windows product.

But such convergences cannot be assured, and probably look beyond 1988. In the meantime vendors must make some tough decisions. A vendor to watch on this issue is Hewlett-Packard, which not only is technologically smart but also understands and is committed to both PCs and Unix.

HP's recently announced New Wave application environment (graphical interface, compound document capability through an object management facility, access to the corporate network, including potential hooks to non-HP systems) now uses Windows 2.0, but will port to the Presentation Manager. HP is also figuring out how to add Unix. When it does, it will be interesting to see how X Window is treated, since in the past HP has indicated that it is considering making the MIT-developed product its standard windowing interface.

RISC Systems Enter the Mainstream

As the ***Gray Sheet*** has said for some time, Reduced Instruction Set Computers do represent a significant, but not revolutionary, rethinking of CPU design techniques. Led by universities, IBM, Hewlett-Packard, MIPS, and others, the body of research and experience has become compelling. Now significant products are coming to the market.

The wide interest in Sun's SPARC technology, coupled with HP's increasingly successful Spectrum products and IBM's still underutilized RT, are just the early entrants in the race. Recently even Digital, a previous nay-sayer, has indicated that it has seen the light, and will bring out a RISC system sometime in the 1980s.

The SPARC effort is a needed reminder of the fact that the business of building standard CPU engines did not begin and end with Intel and Motorola. SPARC is just the first of several efforts to establish new standards for high performance CPUs. The Japanese TRON projects reflects similar thinking.

A key remaining question for 1988 is whether RISC systems can prove themselves outside of the technical computing realm. HP and IBM certainly seem to think so, and they know as much about it as anyone. HP at least is even garnering sales. Pure CPU speed may not be as crucial to commercial applications as it is to technical ones, but it's important enough that designers will want the fastest engine available.

U.S. Vendors Stay at the CPU Forefront

As long as we're not talking about chips or peripherals, the U.S. vendors' competitive position looks strong. The basic rule of thumb is that when design technologies are changing

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rapidly, the U.S. with its entrepreneurial energies will stay at the forefront. And with new microprocessors, RISC designs, and new parallel and multiprocessing architectures evolving quickly, such change seems a given for at least the next five years.

Long term, things are probably not so rosy. Semiconductors are ultimately the heart of the system, and here the Japanese challenge is formidable. Whenever design issues do stabilize, a component edge will begin to assert itself.

European vendors remain most vulnerable of all. Their basic weakness in components, coupled with the growth of Unix, makes their markets much more open than ever before. European vendors have recently been big supporters of Unix, but this may be a case of the old maxim that "the worst things in life come after you get what you want." Other than distribution, support, and application software, it's hard to see what the Europeans bring to the party.

First Cracks in the Digital Armor

Although 1988 will in all probability be another good year for DEC, some fundamental problems are clearly emerging. The demand for Unix systems will soon obsolete the one operating system message; lack of support for PCs and Microsoft Windows remains an Achille's Heel; transaction processing performance is still a sore point; VAXStations will continue to be pressured by the likes of Sun, Apollo, and others. The list could go on.

On the bright side, the MV 2000, II, and 3000 lines remain industry-leading products that will grab share from IBM and others. In fact, the 3000 family will prove one of the industry's most highly competitive systems in 1988, so competitive that it makes DEC's own 8000 line look overpriced. The year ahead should be a good one, but negative pressures are definitely starting to build.

More Blues Played in Armonk

Mainframe demand is flat; the 3090s are three years old; PCM competition has never been stronger; and the 9370 has been a disappointment. Clearly, these aren't the best of times for IBM 370 architecture, and Summit is still some two years away. Growth here will be minimal in 1988.

With its midrange position still deteriorating, IBM is turning to its upcoming S/3X-based Silverlake system to restore order. With this product, the decade-long debate about the virtues of the S/38 architecture will have come full circle, and the technology may finally get its chance to compete. As to its prospects, the answer will be in the details. So stay tuned.

As for IBM's other great initiative, the PS/2, it is currently holding its own. Although the tangible benefits of the Micro Channel today are few, it seems to the *Gray Sheet* that IBM is slowly winning the battle of convincing the industry that true benefits will indeed emerge, and that's all its big customers need to know. A rout of the clones is obviously not in the cards, but a slow shift in the slope of the playing field may well be emerging.

Tandem and Sun Stay on a Roll

You can't blame Tandem if occassionally its eyes grow bigger than its stomach. The company looks out on a multibillion dollar transaction processing marketplace, and sees industry leaders IBM and DEC in turmoil. IBM still has a good OLTP story to tell only at the 3090 end; the S/36 and 9370, be it DOS/VSE or VM/CICS, don't really cut it. As for Digital, it's taken a page from IBM's book and is mostly talking futures. Indeed, when Tandem hears all the things IBM and DEC are *going* to do in OLTP, it must be tempted to start an ad campaign saying simply "Tandem has it now."

As for Sun, few vendors are in better position to ride the combined movement toward workstation-based computing, networks, windowing, and standards. Even when 386 systems start to cut into technical computing markets, Sun will be on the crest of the wave with an 80386-based workstation due probably in the first quarter of 1988.

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It will run both Unix and the Microsoft operating systems, necessary given the vagaries of PC networking, graphics, and DOS growth paths. In any case, low-cost Unix workstations can probably steal as much from traditional PC markets as PCs (Microsoft-oriented PCs or Macintoshes) will steal from them.

Pervasive Use of 386

This is what forecasters refer to as a layup, the basketball term for a shot so close you can't miss. Although obvious, the 386 is too important to be left off any list of things to look for in 1988. With OS/2 getting closer to reality, users are starting to realize that the performance of 386 systems may soon be necessary. And though still expensive, 386 system prices are starting to come down quickly as more players enter the market.

The coming year should also see some interesting implementations and applications of the DOS/Unix capabilities of the 386, e.g. Unix workstations running some DOS applications, Unix systems as servers for DOS PCs, etc. With a monopoly on 386 manufacturing Intel is clearly in a position of envy.

One Last 1987 Story: Computervision Can No Longer Ignore the Boy Next Door

Joe Henson is a persistent suitor. Prime's president/CEO first began courting Computervision in 1985. When he stockpiled cash for a prospective merger last spring, Computervision was apparently a major (if not the only) target from the outset. When the ***Gray Sheet*** (without a possible candidate in mind) asked Henson if he would consider a hostile takeover, he allowed that he would if the object of his affections were so blind to his charms as to say no.

Computervision said no. On Sunday December 27, Henson sent a letter to Bob Gable, his counterpart at Computervision, advising him that despite Gable's desire to "remain independent," Prime would publicly offer Computervision stockholders a very enticing $13.50 per share in cash. The attempted takeover is valued at around $400 million.

In Prime's parlance, it's an "unsolicited" bid; from the perspective of Computervision management, it's a "hostile" bid; but a degree of cooperation from Gable and his team is probably necessary for the merger to work. Prime has had to ask Computervision not to swallow its "stockholder rights plan" poison pill, and has requested clarification of Computervision's status under the anti-takeover Massachusetts Control Share Acquisition Act.

The ***Gray Sheet*** is usually skeptical about the long-term effects of hostile takeovers. Nevertheless, the feeling here is that while Computervision would suffer some short-term pain, the merger would make sense for both parties.

From Prime's perspective, the merger would greatly expand its share of the worldwide CAD/CAE/CAM market. IDC estimates that today Prime is eighth-ranked among U.S.-based vendors, with a little under 3% of the market. A Prime-Computervision combo would be number three, with almost 12% of the market.

Moreover, there are potential synergies within the combination. Computervision would provide an entry into large accounts where, with the notable exception of Ford, Prime has not been successful in CAD/CAE/CAM. Moreover, a merger could alleviate a degree of market confusion, since both Computervision and Prime market software called Medusa descended from the same British product, but differentiated over the years by the two U.S.-based vendors.

Finally, sharp focus on vibrant vertical markets where it has had some success in the past

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is the best long-range strategy for any proprietary Bunch or non-DEC supermini manufacturer (see the second-generation discussion above). To remain vital, a company today has to follow Andrew Carnegie's dictum to put all your eggs in one basket — and then *watch that basket.*

For its part, Computervision can boast of a nearly completed turnaround from its crisis of two years ago. Gable and his team can feel proud of their Lazarus imitation. Nevertheless, a strong case could be made that a merger would be even more advantageous for its long-term viability than for Prime's.

The crisis was more than just a sudden illness; it was a symptom of developing problems in Computervision's niche of the market — the traditional turnkey, typically host-based solution. Today, that niche is being buffeted from two directions:

- The efflorescence of the systems manufacturers, who can supply their own solutions but with additional support and products (e.g., DBMS and development tools) that specialized vendors find hard to match. It is significant that last year for the first time the "turnkey" vendors surrendered first and second place in the market to IBM and Digital.

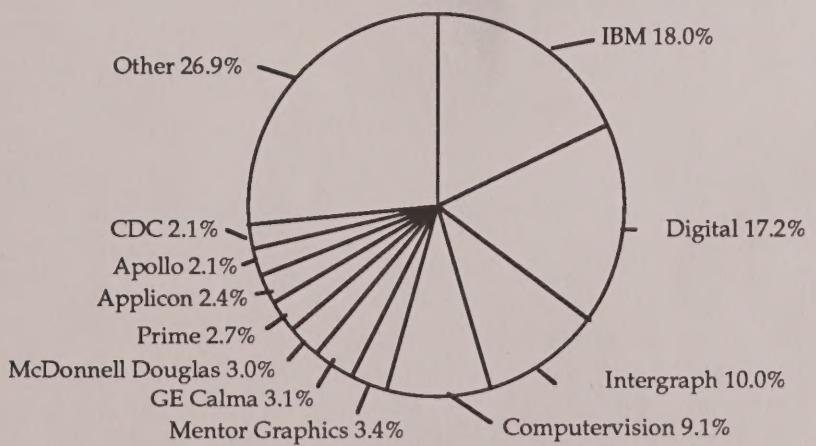
- From another direction, the turnkey vendors are losing market share to application software companies. The solutions companies in turn come in two flavors — vendors like MacNeal Schwendler making direct sales for both new hardware purchases and the installed base, and the new PC CAD solutions for the personal computers that are already omnipresent anyhow.

As a result, while the value of CAD/CAE/CAM shipments for turnkey systems was growing at an annual 12% rate from 1984 to 1986, for computer and hardware companies it was growing at 46%, for PC CAD/CAE companies 54%, and for all other software vendors 32%. This is not an auspicious trend.

IDC believes that eventually Computervision would have had to shift to being a software company or a systems company. Prime's preference is clear — to make the top three CAD/CAE/CAM suppliers all systems manufacturers.

Estimated U.S. Vendor Market Shares of the Worldwide CAD/CAE/CAM Market, 1987

(Source: International Data Corporation, 1987)



TOTAL: $6.4 Billion

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• **CHEN FINDS A HOME.** Okay, you're Steve Chen, wizard of parallel processing supercomputers, and you've left Cray after they cancelled your pet project because of mounting expenses for home-grown chips and such. You need financial backing. Well, how about a company that spends three times as much money on R&D in one year as the Japanese ICOT and U.S. Defense Dept. "strategic computing" projects will spend between them in five? And how about a company that *loves* making as much as possible, everything if it could, within its own walls?

And how about a company fitting that profile that approaches *him*? Well, all those reasons are why Chen's Supercomputer Systems startup will have backing from IBM.

Contrary to some press analysis, IBM's interest in parallel processing didn't start with the investment in Steve Chen (it's been a focus of work at Ken Wilson's Cornell center, for instance). Also, the Gray Sheet doesn't think this means that IBM will be turning to parallel processing any time soon for regular commercial environments. However, it will have developed expertise in the scientific community that it could eventually start implementing in MIS environments by the new millennium.

In the meantime IBM will have a close relationship with a future supercomputer that, like the Japanese manufacturers' products, can interact easily with mainstream mainframes. Apparently an IBM mainframe (a 3090 or its Summit successor) would serve as front-end to Chen's supercomputer.

• **DOUBLE-DUTY WANG.** The VS 7320, a tightly coupled two-CPU system that Wang showed to analysts almost a year ago, has been officially announced in conjunction with beta testing. Wang's first multiprocessor implementation (essentially two 7310s) goes for $390K in a 32MB configuration, and is slated for general availability in the third quarter of 1988. There's been no real rush, since an upgrade path from the still new 7310s wouldn't be a high priority in 1987 (a good estimate would be some 250 7310 shipments this year).

Of more immediate interest may be Wang's new InterOFFICE product, a gateway between Wang's OFFICE and Digital's All-in-1. A harbinger of gateways to come from other vendors? Also, Fred Wang is now officially chief operating officer as well as president.

• **BUT IF GARY HART CAN GET BACK IN?** Uneasy lies the head that wants to wear the crown at Unisys. Some four months after Paul Stern's resignation as president, Joe Kroger has called it quits as marketing chief. The working assumption is that Kroger realized that he was no longer being considered a strong candidate to succeed Mike Blumenthal.

• **EXLEY'S VIEW.** The stock market crash is being viewed with caution in Dayton, but NCR's Chuck Exley so far sees no reason for cutbacks in the company's plans or financial goals for 1988. According to Exley's presentation to Japanese investors on December 15, "Our plans and expectations call for double-digit revenue growth in a constant currency environment and earnings growth that will outpace revenue growth."

• **IT *IS* TELEREX,** except they're calling the merger Memorex Telex N.V. Edelman dropped his bid, and the white knight wed the fair princess. The two segments will, as expected, continue their geographic foci: Memorex's Giorgio Ronchi will be CEO but oversee Europe, while Telex's Stephen Jatras becomes vice chairman and apparently will control U.S. operations.

• **CMI GOES WITH ALF AND BARBIE.** Two months ago the ***Gray Sheet*** was mourning the cancellation of what it considered "the looniest computer industry merger in memory" — Computer Memories' "purchase" of Hemdale Film. Not to worry — it just got loonier. Instead CMI will merge with DIC Animation City, a producer of Saturday morning cartoon shows.

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The Little Engine That Still Can is Now Running On Two Tracks: IBM-Compatible PCs and Their Operating Systems

So it's not vaporware. IBM met the December deadline it gave itself at Comdex for initial delivery of OS/2 Standard Edition 1.0 with time to spare. On December 4 the first 20,000 copies were shipped. Again the psychological (if misleading) association of the Microsoft-designed operating system with IBM-designed PCs (especially the PS/2 line) was maintained by having IBM make the announcement and sign the Federal Express shipping papers.

The good news from early customers is that, with the right hardware, vanilla OS/2 pretty much does what it was supposed to, and is easy to install. There is some bad news, though. On the software compatibility side, for example, there were reportedly more problems with running DOS files in the OS/2 compatibility mode than many users had anticipated.

On the hardware side, the 1MB memory requirement that people were talking about last April for OS/2 is apparently at least 1.5MB. In fact, IBM has published a new table with minimum hardware requirements for OS/2. For 80286-based PCs and PS/2s, the memory requirement for standard edition without a DOS environment is 1.5MB; for a 386 machine, it's 2MB. It's 2MB for any standard edition with a DOS environment, and 3MB for the extended edition without a DOS environment. The extended edition requirement with a DOS environment hasn't been announced, but you've got to figure it's about 3.5MB.

That's about the only kind of news, good or bad, that we can expect concerning OS/2 until next summer. Until the IBM-proprietary extended version ships (July is the target) and the presentation manager appears (November, we're told), most OS/2 licenses will go to users and application developers who want to understand its nature, test its capabilities, and practice programming.

There will be third-party OS/2 applications next year, to be sure, but the likelihood is that they'll be pretty boring. For the most part they will simply be ports from MS-DOS that will offer few improvements (probably mostly in memory constraints) over the original. Creative OS/2 applications will take longer, probably well into 1989 (at the earliest) to take advantage of the presentation manager as well as the increased functionality of regular OS/2. Developers aiming at the corporate environment may also want to incorporate SAA interface and LAN conventions from the extended version.

Meanwhile the Intel/Microsoft world of IBM PC-compatibility hasn't stood still. Despite the PS/2 alternative, a major compatible vendor like Compaq has successfully parlayed its experience with the older, more open PC architecture into even stronger growth than it has achieved in several years.

And then there's the strong growth of the noncompatible Macintosh in corporate computing. After all, if John Sculley wanted to take advantage of all the talk about the presentation manager from Microsoft, and if one of his closest friends in the industry didn't mind lending him some advertising copy, he could be running full-page ads with the message, "Apple Has It Now."

Moreover, despite the imminent arrival of OS/2, the MS-DOS environment is proving

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resilient. After all, it appears that half or more of the PS/2s that have shipped in 1987 were 8086 boxes that can't run the new operating system. MS-DOS is here to stay, and vendors must develop strategies for coexistence. Thus IBM has announced PC LAN Program 1.3, which will allow PC-DOS machines to participate in a local area network with the OS/2 LAN server due next fall.

Moreover, vendors are rushing to add functionality to MS-DOS machines that may delay OS/2 acceptance. Examples would include Microsoft Windows/386, the latest edition (Version 4.0) of the Lotus/Intel/Microsoft expanded memory specification, and Intel's 386 board for PCs and XTs.

Ergo, the bifurcation of the Intel-based PC world (PS/2 vs. XT/AT compatibles, MS-DOS vs. OS/2) will not close any time in the foreseeable future. Different sets of issues will cluster in each half of PCdom, and questions about their interrelationships will grow.

In that spirit, this all-PC issue of the *Gray Sheet* will look first at some of the issues involved in OS/2, and then downshift to some global issues relating predominantly to the cheaper compatibles.

OS/2, Brutus?

Fear, uncertainty, doubt. How often have users and competitors faced those three horsemen of the apocalypse coming from the general direction of Armonk? Now again they ride the night with IBM's entry into the OS/2 marketplace.

Everyone knows there is a new operating system in the land. Everyone knows that while it is essentially a Microsoft product, IBM is behind its development 100%. What everyone doesn't know is when and how it will be implemented in its entirety into the business environment.

The early availability of OS/2 at least does two things. First, IBM and Microsoft obviously want to avoid the enervating delays that plagued Windows. By speeding up the release of OS/2, the marketplace is being subliminally serenaded with a song rhapsodizing that everything is going great with OS/2.

Second, IBM is finally dispelling some of the myths around the implementation of OS/2 and what each segment of the release dates involves technologically. As IBM describes it, there are essentially four levels of implementation, each with its own particular features (standard and extended editions, with or without the presentation manager).

Unfortunately, the advance word on OS/2 Standard Edition 1.0 has not been uniformly good. Some vendors that have been using beta versions of the operating system complain of bugs in the system hindering initial startup procedures. Hopefully, these problems have been worked out; we should know soon, with those 20,000 new licenses out there.

A potentially more troublesome hindrance to OS/2's entry into the general marketplace is its price and storage requirements. In order to implement OS/2, a user needs at least 1.5MB of memory and an 80286 or 80386 Intel chip to have enough power to run software that takes up roughly three times the memory space of MS-DOS. By definition, a system with these requirements is more expensive than generic PCs. Complexity has its costs.

That's just the hardware requirements: OS/2 is three times as expensive as MS-DOS. Particularly for low-end 286-based PCs, the combination of the two types of initial outlay may prohibit widespread entry into the marketplace.

Many companies may not want to migrate from MS-DOS to OS/2. A recent IDC survey indicated that 48% of the companies questioned had no current plans to implement OS/2 as a standard. IDC estimates that approximately 40% of the installed base of PCs capable of running OS/2 (i.e., 80286-based systems and above) will have undertaken the migration trek by 1990.

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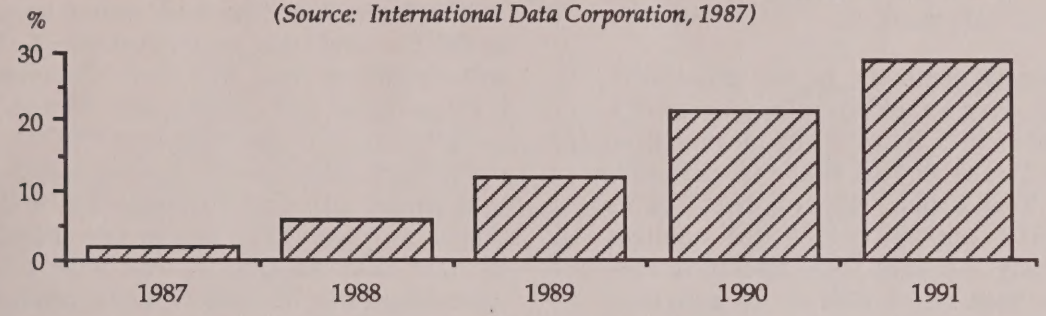
Proportion of the Total U.S. Installed Base of Intel 80286-Based and Above Personal Computers Expected to Be Running OS/2, 1987-1991

(Source: International Data Corporation, 1987)



Moreover, there is today an installed base of about 9.5 million 8088/86-based PCs out there just in the U.S. Some may add the 286/386 accelerator cards, memory, and storage necessary to run OS/2, but only if operating system standardization is so critical a priority that the extra investment in money and headaches can be justified. The rest of the 8088/86 base, including probably the great majority of individual purchases, will for a long time remain MS-DOS boxes that will continue to need care and feeding.

Let's just look in more detail at some of the possible expenses for upgrading to OS/2. Right now standard edition OS/2 costs $325 (for a limited time licensees of PC-DOS 3.0 or higher can upgrade for $200 while maintaining their DOS license); the extended edition will go for $795 (with presumably a break for initial standard edition licensees comparable to the DOS 3.0 offer).

Then a lot of the 286 installed base (even a PS/2-60 if you want to run the extended edition of OS/2) will need add-in memory. Average cost of an add-in board today tops $1,000. In a number of cases, at least another 10MB hard disk will be required, then a mouse . . . .

When add-in costs mount to the $1,500-2,000 range, the question should become, why not just buy a whole brand-new 386 system with the necessary memory and OS/2 for about double the price, or not even that much. Personal computers with a 80386 chip are currently going from $3,000 (even less for some roll-your-own kits) to $14,000, depending on configuration.

Now, it should be added that these costs will certainly decline. The price tag for OS/2 will drop, and the hardware costs will continue on their downward slope. Of course, this means that the alternative 386 buy will also continue to be attractive when compared to an OS/2 upgrade, but at least the ideal of standardizing on OS/2 will become more practicable by 1990 or so. More to the point, by then there might actually be a compelling reason to upgrade, as the first significant OS/2 packages begin to appear.

(This article is partially based on material by Nancy McSharry, senior analyst in IDC's PC planning service.)

IBM, Microsoft, and Novell in the LAN Mine

Presumably (and hopefully) it will be before 1990 that the issue of OS/2 local area networks is clarified. With luck, we should have a clearer picture before 1988 is over.

The big question mark involves (surprise, surprise) IBM's plans, intentions, and motivations. Besides the presentation manager, the major addition in IBM's Extended Edition 1.1 in November 1988 will be a requester function that allows workstation access to a server. In conjunction with 1.1, IBM will release the OS/2 LAN server program, which will permit resource sharing and help define and manage access to LAN resources.

What IBM has not done has been to make a commitment to Microsoft networking comparable to its alliance in the DOS world, where the

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PC LAN program was an implementation of Microsoft Networks (also the source of Ungermann-Bass and 3Com PC LAN technology — in fact, of 80% of the PC LAN market).

What piques curiosity is the possibility that Novell may in effect take Microsoft's place in IBM's PC LAN strategy this time around. On December 10 it held a special seminar in New York City in which it discussed its plans for OS/2 support. Novell will maintain the proprietary Netware LAN operating system that has been responsible for its growth to date, but will include a coprocessor for OS/2 applications that will allow a division of labor between networked and computation-specific tasks.

The linchpin will be the Netware Requestor, an OS/2 module that was "developed by Novell with assistance from IBM." It will access Netware services and allow users to run OS/2 workstations in conjunction with DOS PCs. This pretty much sums up what the requester function in extended edition 1.1 is supposed to do. At this point it seems fair to entertain the possibility that IBM assisted Novell with the Netware Requestor because Novell's product will appear in IBM's extended version of OS/2 a year from now.

Rehearsing for the Next Act In the IBM-Compatible Market in Europe

As in the United States, the European PC market has developed in two stages. The first, which lasted from the late 1970s to the early 1980s, was the era of hackers. Because Apple played a less conspicuous role in Europe than in the U.S., the European market was even more tilted towards "hands-on" computing than the American in this phase. The second stage began in Europe around 1983 and centered on standard applications. Again as in the U.S., the watermark of this second phase has been IBM-compatibility.

In fact, depending on how you measure it, it is possible to argue that IBM-compatibility (i.e., Intel chips, Microsoft operating system, and IBM-like ROM BIOS) is even more central in Europe. It represents a lower percentage of unit PC shipments (not quite 40% in 1986) than in the U.S. (50% in 1986), but a higher percentage of the value of PC shipments (three quarters of $8.1 billion rather than two-thirds of $14.2 billion).

As in the U.S., standard applications have had the strongest impact in corporate environments. Shipments of IBM-compatibles in 1986 accounted for 71% of the business/professional sector of the unit PC market in Europe, 49% of the scientific/technical sector, 31% for education, and 4% of the home/hobby sales.

Nevertheless, the compatible market penetration remains spotty, with some countries more hardened against non-Microsoft environments than others. In the value of overall PC shipments, IBM-compatible PCs represented a high of just under 80% of the total market in Norway to a shade over 55% in Finland, its neighbor on the north.

More importantly, in the two most significant markets — the U.K. and Germany, which overtook Britain in 1986 as the most lucrative PC market in Europe — IBM-compatibility still lags behind the overall European average of two-thirds of the market. IBM-compatibles were a sniff over 61% of the value of German shipments last year, and a whisker over 56% of the market in the U.K.

In fact, in unit shipments, Germany has the lowest market penetration for IBM-compatibles in Europe, with about a quarter of all PCs shipped meeting the definition of compatibility. Spain does just a hair better. Two countries ship over 60% of their PCs with MS-DOS and Intel chips (Sweden and Norway), and two more over 50% (the Netherlands and Denmark), but they are exceptions.

The rest of the European PC market still includes a not insignificant CP/M component

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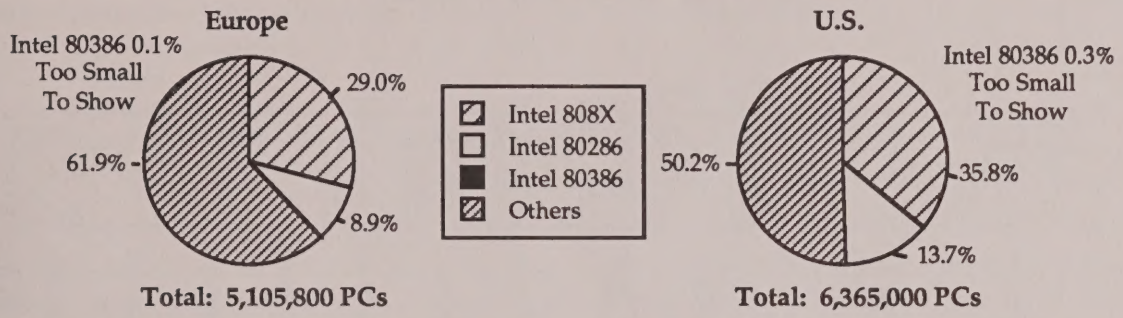
European and U.S. Market Shares of Intel-Based PC Unit Shipments Versus Other Chips, 1986

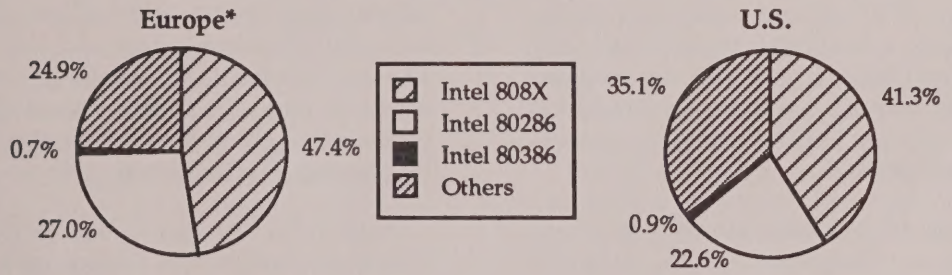
(Source: International Data Corporation, 1987)



Total: 5,105,800 PCs **Total: 6,365,000 PCs**

European and U.S. Market Shares of the Value of Intel-Based PC Shipments Versus Other Chips, 1986

(Source: International Data Corporation, 1987)



Total: $8.1 Billion **Total: $14.2 Billion**

*Dollar value derived from local currency translated into the OECD daily weighted average exchange rate to the dollar for the whole of 1986.

(13.5% of unit shipments and 6% of the value) and a growing Unix faction (barely a blip on the screen for unit shipments, but almost 5% of market value). The rest of the market — over half of unit shipments, and almost a quarter of shipment value — can be summed up as "proprietary." It should be noted, though, that while Apple is finally taking a bite out of the European market, it is far from the alternative operating environment that it has become in the U.S. Consequently the "proprietary" section can serve only as a meager substitute for the standard applications in IBM-compatibility.

What this means is that Europe has not quite made it into the third phase of personal computing as it has developed in the U.S.: a two-tier system of commoditized MS-DOS products in the lower half of the market, and a low-volume, high-performance, high-priced segment (largely MS-DOS, prospectively OS/2, and increasingly Macintosh or Unix) drawing the upper half towards it. Both tiers are within reach in Europe, but require additional momentum.

This may seem strange, given the success of a company like Amstrad over the past couple of years with its inexpensive IBM-compatibles. The point is, though, that Amstrad is a pioneer in implementing new growth strategies in Europe, many of them borrowed from the U.S. Its track record is luring new runners to the starting blocks, but not enough yet for a meaningful race.

One principal reason for their hesitation has been European PC manufacturers' reluctance

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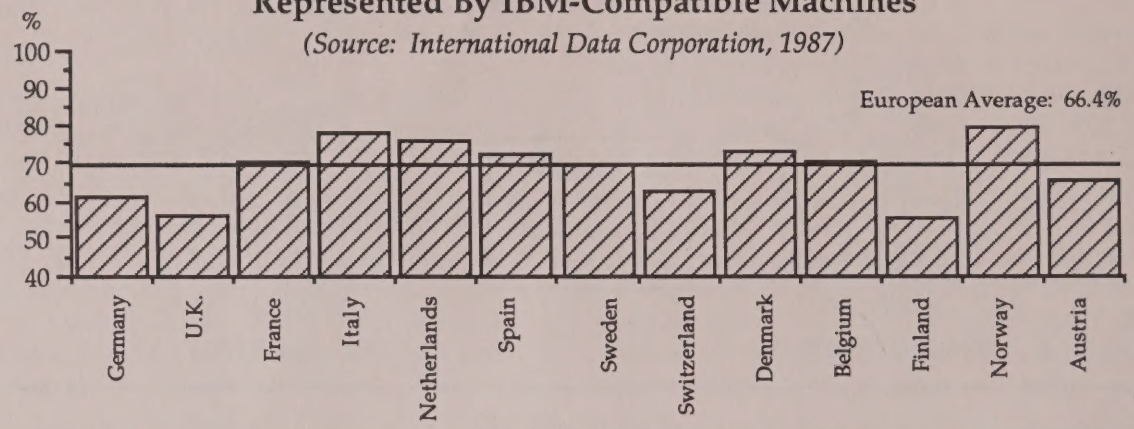
Proportion by Country of the 1986 European Value of PC Shipments Represented By IBM-Compatible Machines

(Source: International Data Corporation, 1987)



Note: European nations are listed in descending order of the value of PC shipments, left to right.

to implement innovative distribution strategies, often due to a few bitter experiences in the past. Before end-user street prices dropped below the local currency equivalent of $2,000, a number of fingers got burned while experimenting with distribution channels.

Too often retail computer stores (e.g., Computer Market and Steiger in the U.K.) failed to generate significant business from walk-in customers. In addition, companies selling very low-priced home machines tried out mail order, but often suffered from quality control problems and a lack of proper service facilities.

People should learn from experience, but it's like Mark Twain said: a cat that scorches its tail on a stove burner won't sit on a hot oven any more, but then it won't sit on a cold one either. The significance of Amstrad and Schneider (the company that sells Amstrad products into West Germany) is that they are at the forefront of PC consumerism in Europe.

Significant low-end PC-compatible products have been launched in Europe by Commodore, Atari, Tandy, and Amstrad in 1987. These companies have seen the advantages of selling the machines through retail channels. In the U.K., most are chasing the specialist electronics stores such as Dixons, Laskys and Currys. It is significant that the highest priced products currently being sold in these stores are camcorders retailing at around $2,000.

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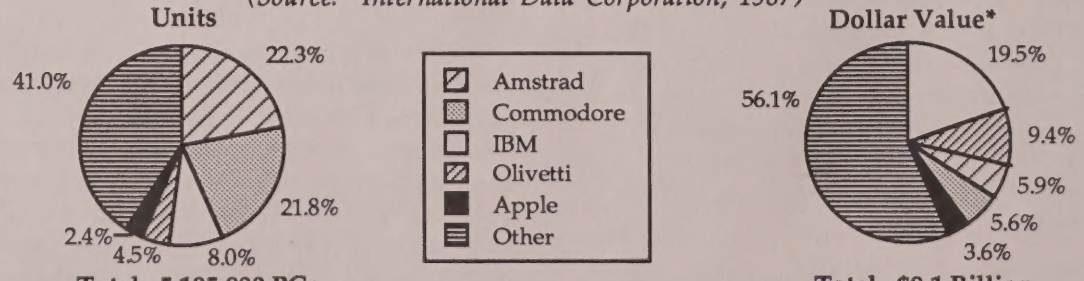
Vendor Shares of European Personal Computer Shipments, 1986

(Source: International Data Corporation, 1987)



Total: 5,105,800 PCs **Total: $8.1 Billion**

*Dollar value derived from local currency translated into the OECD daily weighted average exchange rate to the dollar for the whole of 1986.

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If volume-oriented distribution policies succeed in taking a much bigger chunk of low-end personal computing from PCs in the "Others" category, both CP/M and proprietary, they will likely benefit the IBM-compatible market as a whole. Man does not live by garlic bread alone — you need a plate of spaghetti to go with it. And the PC industry in Europe or America can't live off of 386 boxes and OS/2 applications alone.

An Inchon Landing for PC Manufacturing? The Korea Alternative

A glass half-empty or half-full? A polity half-dictatorship or half-democracy? A society half-peasant or half-industrial?

So what are we to make of Korea, the site of next year's Summer Olympics? Do we remember this past summer's guns and billy clubs? Or do we note that in this month's election the opposition charges of corruption were no worse than nineteenth-century electoral practices in the U.S. or Britain (see Dickens' *Pickwick Papers*), and that, as in Ronald Reagan's America in 1980 or Maggie Thatcher's Britain in 1987, a united opposition might have won?

A similar range of questions can be asked about the Korean personal computer industry, a hot topic of discussion in both the U.S. and Japan. Do we look at the new manufacturing giant that is supplying key U.S. vendors like Leading Edge? Or do we single out one of the few countries in the world where the domestic market for 8-bit PCs is growing, while the XT market shrinks? A new report by IDC's Korean office offers some fascinating glimpses at answers.

Around 10 large manufacturers control the PC export business in Korea. Daewoo Telecommunication OEMs to Leading Edge, Daewoo Electronics to Corona and Cordata, Hyundai to Blue Chip, Samsung Semiconductor and Telecommunication to NCR, Trigem to Computerland, and so on. Over 90% of these exports have gone to the U.S., 8% to Europe, and under 2% to Japan.

It has been a lucrative business. While the volume of unit PC exports grew a little under 50% from 1985 to 1986, to 1,462,500 PCs, the dollar value of those exports nearly tripled, to $406.4 million. The reason was a shift from 8-bit PC-compatibles to XT-compatibles and, increasingly, AT-compatibles.

But it is a precarious business. From figures available for the first six months of the year, it looks like unit exports in 1987 will be roughly flat with 1986. Moreover, despite a much higher mix of XT- and AT-compatibles, the dollar value of exports will also be flat.

The problem is that it's not that remunerative to be an assembly line building commoditized products with other people's technology. The average export price of a basic two-floppy XT-compatible was $2,495 in 1985, $1,295 in 1986, and as low as $600 recently. Korean manufacturers need a price of at least $700 to eke out a profit, especially since 20% of PC parts are imported from Japan. Due to the appreciation of the yen, raw material now accounts for over 80% of the export price of an XT-compatible, and profit margins have shrunk from 10% a couple of years ago to 2% or even negative.

Luckily for the Korean manufacturers, the Reagan administration and Congress don't get all that exercised about Asian dumping unless it's from Japan. Also luckily for the Korean manufacturers, the domestic market is showing signs of finally taking up some of the slack.

The domestic market represented over a third of the total value of Korean PC shipments in 1985, but the pie was still pretty small. While exports were growing at nearly a 200% clip in 1986, the domestic market increased at a tamer 11% rate, to $89 million. The

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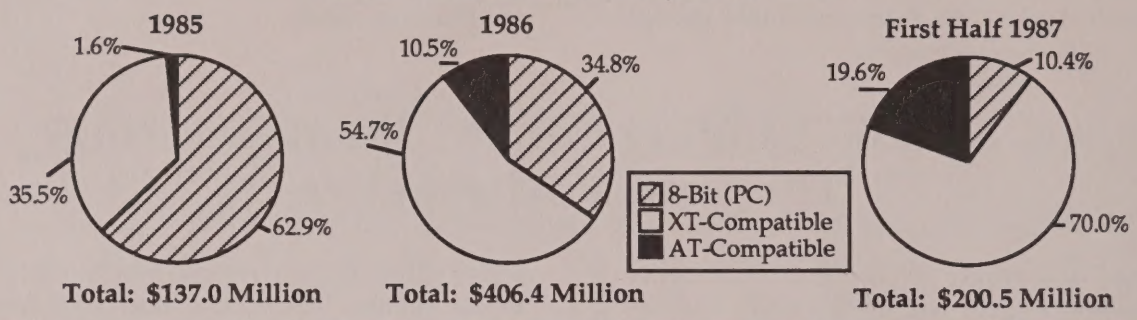
Dollar Value of Korean PC Exports by Compatibility Class, 1985, 1986, and First Half (January-June) 1987

(Source: International Data Corporation, 1987)



Total: $137.0 Million **Total: $406.4 Million** **Total: $200.5 Million**

domestic share of the total dipped to 18%. However, for the first half of 1987 the percentage is back up to almost a quarter of the total market.

If the domestic market ships the exact same dollar value in the second half of 1987 as it did January through June, it will have grown 40% over 1986. The likelihood, though, is that the growth curve will continue upward, and the market will have jumped over 50%.

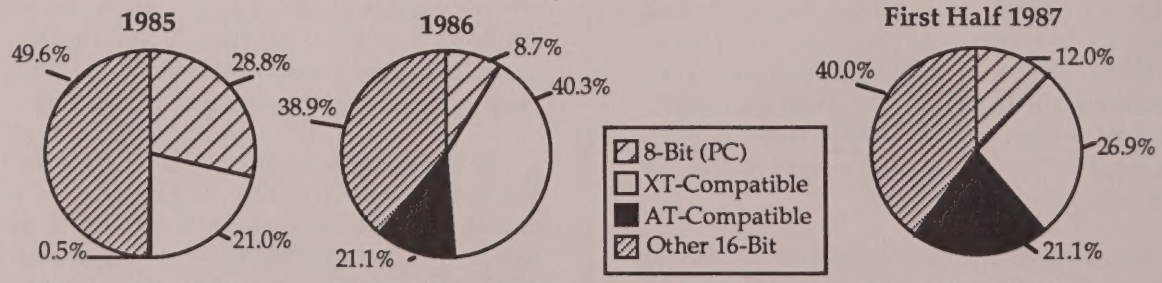
The growth is occurring in two areas in particular. The reason that 8-bit PCs are undergoing a resurgence is that the Korean government has made a commitment to computer literacy; most of those baby PCs are going to schools. Meanwhile the Korean manufacturers who have been exporting ATs are starting to sell their products domestically. The "Other 16-bit" category should also start to grow faster in the second half of 1987, since Trigem has just become the agent for Apple Computer in Korea.

Not all of this growth will accrue to Korean manufacturers. As a result of negotiations with U.S. trade officials, on July 1 the Korean government ended preferential treatment of locally manufactured PCs and reduced the tariff from 20% to 15%. Ironically, the chief beneficiary may not be the U.S. but other Asian countries. Korea may soon find itself inundated with Taiwanese PCs.

Nevertheless, the emergence of a domestic market is fortuitously timed. As many developing nations over the past two centuries can testify, dependence on "cash crop" exports — even crops of PCs — does not a vibrant economy make.

Dollar Value of Korean Domestic PC Shipments by Compatibility Class, 1985, 1986, and First Half (January-June) 1987

(Source: International Data Corporation, 1987)



Total: $80.2 Million **Total: $89.0 Million** **Total: $62.6 Million**

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The Slack 9370 Market Refocuses Attention on IBM's Silverlake and S/370 Strategies

Aw shucks fellas, we never intended the 9370 to be a VAXkiller. Because it was planned over four years ago to meet the needs of large S/370 users, its principal role would be too restricted to stop Digital's momentum. Naturally we'd take any sales we got, but our expectations were never so utopian that you could actually say we're disappointed in the 9370 market so far. Hey, if you're disappointed, that's your problem, not ours.

But if you really want to hear about a neat machine, something that really was designed to confront Digital, there's this S/3X box we've developed at a facility near a place called Silver Lake. . . .

That was the message, in so many words, that Steve Schwartz, president of IBM's System Products Division (SPD), delivered at an IDC conference earlier this month. The timing was interesting, because Schwartz had to speak at a time when the general public was being bombarded with a spate of stories about the relative paucity of 9370 sales. The question underlying many of the reports was simply, can't IBM do anything right these days?

At least Schwartz's presentation was under the auspices of an organization that, no matter what the hopes at SPD might actually have been, could honestly say that the 9370 isn't a disappointment, since its expectations were never that exuberant. IDC has been virtually the only market research company in the business that hasn't had to cut back first on 1987 shipment estimates, and then on projections through 1991.

The reason that IDC initially pegged probable 1987 shipments at only around 5,000, a figure later blessed by IBM (even if it might have to do some hustling to meet the figure by December 31), is that that's what our surveys were saying, and the results made sense. SPD had good reasons not to stress the limitations of the primary 9370 markets — a limited number of large customers who could benefit from a degree of distributed processing, and 43XX customers who needed to upgrade but not all the way to the level of the new 4381s.

So where does this leave IBM? Do Schwartz's explanations and promises hold water, or has IBM gotten like Indiana Jones, making it up as they go along?

First of all, the S/3X combination product, which is understood to be a redesigned S/38 running recompiled S/36 programs, is still vaporware. There are no specs, no prices, no performance comparisons, no boxes. However, conceptually at least, it would make sense for IBM to position it against DEC:

- Because of its comparative ease of use and object-oriented DBMS, a S/38-based midrange product alleviates the

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personnel overheadaches required to support a S/370 product beyond the central computer site.

- Like the VAX architecture, it would offer compatibility across the midrange, and only across the midrange. This restriction is potentially a boon rather than a liability, since it is in IBM's interest to downplay Digital's claims to be playing in the large-scale ballpark. The *Gray Sheet* won't be surprised if, starting next year, all IBM-sponsored comparisons to VAX systems will be to Silverlake.

As for what the S/3X hybrid will be like, the *Gray Sheet* likes the conceptualization offered by IDC's Frank Gens. Rather than the poetic Silverlake, Gens calls it the "9380": i.e., a S/38 that physically will look a lot like a 9370. IBM must hope that its early sales won't look like a 9370.

The "9380" Silverlake product would have extended the life of S/3X in any case; the performance to date of the 9370s adds a few more years. In any case, Mr. Schwartz avers that IBM has no intention of pruning its multiuser architectures to just S/370.

Now, that should be read as saying no intention as of today, as of SPD's executive offices. No bets should be made one way or the other about what the IBM position on S/3X will be by the mid-1990s. The important thing to note is that by then, if SAA works out, the issue of separate architectures may be less critical. If IBM decides to migrate S/3X customers to the S/370 line, SAA would provide both the consistent "friendly" human interface and application portability that could protect a 3X user's interests. If IBM feels compelled to maintain separate architectures, SAA would hopefully meet the argument of its competitors (DEC, Unix vendors, etc.) that they offer full compatibility.

Moreover, no matter what the long-term decision on S/3X may be, the short-term effect of a "9380" would allow IBM some of the benefits of convergence. The 9370s and "9380s" will in all likelihood share peripherals, subassemblies, and components. The result would be a considerable reduction in IBM's manufacturing costs for the midrange.

This benefit would be augmented if, as IDC reads IBM's hints, a single midrange S/370 family is in the offing. There may or may not be a 4381 upgrade in 1988 (models 31 and up) rather than just a pricing action, but by early 1989 there should be an announcement of a 4381 follow-on. This, too, will likely look a lot like a 9370. There is therefore an option to allow upgrades from the 9370 into the 4381 follow-on.

For a company that has been suffering from customer perceptions of Byzantine complexity in the midrange, paring offerings down to essentially two lines rather than simply two architectures must be appealing. For this reason alone, SPD does have reason for concern about the weak reception and poor perception of the 9370s.

Finally, IBM should feel somewhat disappointed in 9370 sales to date, even granted its purported nonutopian expectations about market limitations. Many corporations are in fact creating distributed processing schemes, except that they are not mainframe-oriented. The key to the 9370 is that, in the large user sites it is targeting, it is supposed to buttress and even add to mainframe performance requirements. Every sale lost to Digital or anyone else potentially locks IBM out not only from future midrange sales, but from future mainframe growth as well. That hurts. Bad.

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IBM: Monarch of Mountains

The mountain metaphors employed in the popular, semiofficial designations of IBM's current and future mainframe generations, the Sierra (3090) and Summit lines, have acquired an increasingly ironic tinge. The fastest industry growth continues on the PC plains, while corporate buyers and software developers often seem more interested in the midrange foothills. As a result, even though Sierra sales have been decent if not spectacular in 1987, IBM revenue is stuck on a plateau.

Nevertheless, much of IBM's long-term strategy remains, as it must, centered on the traditional mainframe. It is sponsoring distributed processing and networking schemes that revolve around mainframes, and is emphasizing the advantages of centralized processing power and control both for critical software programs (database management, transaction processing, etc.) and for overall corporate management.

Which is why it very much matters that, in 1988, IBM is expected to introduce both "F" enhancements to the Sierra line and an operating system revision ("MVS/XB") that will run on both the 3090-F models and the Summit generation; that a 3090-500 is around the corner; that the "F" enhancements will permit horizontal upgrades; that the Summit introduction may occur in late 1989, with the shipment of 120-130MIPS and 210-220MIPS systems; and that the high-end Summit will start out (before kickers) at 350-400MIPS.

Predictions about IBM have historically been a dime a dozen. What are these worth? These days, predictions are backed by a reserve of knowledge from the horse's mouth.

IBM's principal reaction to its weak sales for the past two years has been to designate 1987 the "Year of the Customer." After the heavy dose of PR is set aside, the most significant corollary has been a corporate decision to try to lock out competitors by revealing to users much more about future plans than it has ever deigned to in the past (or probably could have gotten away with).

There is a potential down side to announcing major hardware, software, and communications products a year or more in advance, and to preannouncing future products to major customers. With the assurance of more functional offerings with better price/performance just around the corner, users may understandably opt to sit tight and wait.

Moreover, even if the strategy does have the desired interim effect on some customers of locking out IBM's competition, on others the details about future products may convince them that they will not seriously lose out if they go with PCM or noncompatible alternatives today. The "Year of the Customer" campaign may therefore be contributing to the very slackness in current IBM sales that it was designed to counteract.

But the "Year of the Customer" openness has positive effects on customers who can now plan future purchases and make decisions about software and networking with a higher degree of certitude. And for industry watchers, it allows a higher level of confidence in their projections.

One such watchman is Frank Gens of IDC's Financial Services subsidiary. In a recent special bulletin to his clients, Gens summarized what he has gleaned from IBM sources and major users about IBM's mainframe strategy through the mid-1990s, and what he and his confreres here believe will happen based on past experience. The following is based principally on the scenario laid out by Gens, with a dollop here and there of editorial interjection.

The Last Few Miles Up the Sierra

The "F" series of 3090 enhancements, a PCM exec recently harrumphed to the *Gray Sheet*, is the most lavishly leaked IBM product ever, with the exception of course of Silverlake. Now, the idea that there would be at least one other midlife kicker for the Sierras was more or less implicit in the timing of the "E" enhancements (see the *Gray Sheet*, Vol. 22, No. 19-20, February 27, 1987), but it is virtually unprecedented to feel that we know so much about the "Fs":

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- Announcement should be expected in either the first or second quarter of 1988, depending on whether anticipation starts to affect "E" sales.

- Besides improved cycle time, the principal performance improvement in the "F" line would derive from its support for a new I/O architecture.

- The new I/O architecture will support channel-attach and channel-to-channel links for distances up to 3km.

- It will also support a channel speed of 6MB/second, which will likely mean less for performance than for peripherals. IDC expects that the new channel speed will be supported only on the 3990 controller, not 3880s. This restriction would also apply for the possible 1989 delivery of fiber optic channels with a speed of up to perhaps 18MB/second.

- Because the new I/O architecture will be built into the F line, a new version of MVS/XA (MVS/SP 3, popularly known as MVS/XB) will be released to support 3090-F models as well as the future Summit generation.

- The "F" line would once more increase expanded storage capacity, and shave expanded storage prices.

- This time the performance boost (25-30%) is large enough and, with the new I/O architecture and operating system revision, significant enough for IBM's long-term strategy that IBM will permit horizontal upgrades (e.g., from a 180E to a 180F). The "E" enhancements have required a 3090-180 owner to upgrade to a 200E, with no 180E option.

- There will almost certainly be a new five-way processor added to the 3090 family (presumably to be called the 3090-500F).

- Higher list prices (up 6-12%) on "F" models will likely lead to a price/performance increment over "E" models in the vicinity of 20%.

The big news in the "F" enhancements is expected to be the new I/O architecture, which is likely to feature serial I/O as well as higher channel speeds. One effect would be a spurt in data path performance between expanded storage and the 3880/3990 controllers, and hence another incitement for customers to exploit expanded storage.

Another consequence of the new I/O subsystem is that the "F" performance gains will vary sharply at different sites, depending on the application mix. Potential customers should be aware that the shorthand MIPS rating that will be attached to the new systems may not be relevant to their situation.

- Compute-bound applications will likely benefit only from the extra kick in cycle time — say, another 8-10%.

- The big gainers will be I/O-intensive applications. These include programs of central importance to IBM's overall strategy (e.g., DB2, CICS/VSAM, and TSO).

Finally, and crucially, IBM apparently considers the "F" enhancements, or wishes them to appear, the true break between the 308X and 3090 generations.

Two months ago the *Gray Sheet* attended an IBM briefing where a schema of IBM's mainframe strategy was laid out. The presenter, Vern Barber, noted that XA 32-bit addressing, which was the real break with 303X architecture, postdated 3081-D shipments (though actually only by a matter of months). The cleavage between the 308X and the 3090s, he suggested, was imminent.

Now, this implies that one factor that has impeded 3090 sales and that kept the used 308X market bullish for so long — the lack to date of major distinctions between Sierras and their predecessors — was planned that way. It's true that IBM hasn't really pitched the differences

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Expected 3090-"F" Performance and Pricing

(Source: International Data Corporation, 1987)

	MIPS*	$MIPS**	PRICE***
3090-150F	12.4-12.9	$137-145K	$1.7-1.8M
3090-180F	20.6-21.5	$128-136K	$2.6-2.8M
3090-200F	38.5-40.0	$118-126K	$4.5-4.9M
3090-300F	54.8-56.9	$112-119K	$6.2-6.5M
3090-400F	69.8-72.5	$122-130K	$8.5-9.1M
3090-500F	80.0-85.0	$122-130K	$9.7-10.5M
3090-600F	95.0-98.8	$117-124K	$11.1-11.8M

*Assuming a 25-30% performance improvement; MIPS should be understood as a conversion factor from prior S/370 models at the midpoint of commercial performance ranges in comparisons by IBM.
**Assuming a 15-20% price/performance improvement.
***Based on a 25% performance and 15-20% price/performance improvement.

that do exist (e.g., the VF, expanded storage, and 4.5MB/second channels) as revolutionary discontinuities; it seems that it is about to make that argument about the "F" models.

The corollary is that the Summit announcement will not include really major changes from 3090-F models. These would occur later in the evolutionary cycle. In fact, in what could be considered a jocular preemptive strike, Mr. Barber twitted the consultants in the audience that when Summit appears, they'd be complaining about the absence of real news just as they did in February 1985.

This is the background for IDC's assumption that the long-rumored "XB" operating system revision will accompany the "F" enhancements more or less in tandem. A revision would be necessary in any case to support the new I/O subsystem. The rest of "XB," which is likely to follow hard on the heels of the "F" models if it doesn't walk hand-in-hand, would probably add virtual address space to 38 bits. This would support virtual storage of around 286 gigabytes, well over a hundredfold increase from today's 2GB.

The story here is that, contrary to some speculation, the "XB" revision, at least in its initial phase, would be supported on 3090s as well as Summit systems. True, the working assumption must be that it will run only on 3090-F models (or higher, should there be "G" enhancements in 1989), but the entire 3090 base has an upgrade path to "F" status.

Introducing "XB" in 1988 makes sense. Even if users typically might not need XB functionality until they reach Summit performance levels, it is in IBM's interest to get users to begin migrating applications to the revised operating system as soon as possible. Otherwise Summit sales could get off to a slow start as customers roll their eyes at the costs both for new hardware and for the software migration to take advantage of the new hardware.

In other words, maybe there's a bit of special pleading in IBM's revisionist analysis of the gradual 308X-3090 transition; however, the analogy to the two-stage 303X-308X and XA transition is clearly germane, even if this time the order is reversed (first the operating system, then the new systems).

Another side effect of the F/XB announcements may be to stem a little of IBM's recent market share erosion to the PCMs. Amdahl and NAS can arguably survive "XB" without the sharp dips caused by the XA announcement. Amdahl in particular can bank on the first year of three- and four-way processor shipments to maintain its growth in 1988. However, IBM will have a potent weapon in its arsenal during the period that it has XB and the PCMs don't.

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How long will that be? Amdahl thinks that, with the company's growing expertise in maintaining compatibility and IBM's hints about what XB will entail, there should be little problem in attaining XB compatibility well within the year from availability it took Amdahl to incorporate XA. NAS is not so publicly bullish, since it couldn't meet its deadline on XA availability. However, this time it hopefully won't have to contend with its partner Hitachi's involvement in an embarrassing Computergate affair. It seems likely, then, that both PCMs could have XB compatibility before IBM announces Summit.

Summit planning is also behind the probable announcement of a 3090-500F (essentially a 300F plus a 200F). Not only would it fill the wide performance gap between a 400 and a 600, but it should increase 300 sales. Right now 200 users seem to be balking at 300s, since a 200-400-600 strategy is a much more even upgrade path. From a 300, a user has had to jump all the way to a 600.

Increasing 3090-300 sales is likely a high priority for IBM, since it wants users to recognize that a three-way processor is no more recondite or difficult than a two-way system. IBM wants this because the three-way system will be the probable base for the Summit generation. In that context, IBM would like the 3090-300 to help prepare the way for Summit the same way that the two-way 3084 trailblazed for Sierra.

After the F models, what will happen in the final two years of the Sierra generation? There will certainly be a 15-20% price/performance gain in 1989, per IBM's promise of annual increments. It's still too early to tell, though, whether it will be achieved solely through price cuts, or through a combination of moderate price cuts and moderate performance boosts (c. 10%) in "G" models.

The Looming Summit

At this point, every IBM mainframe announcement will be, and should be, analyzed in the context of the Summit generation. Mainframes, and mainframe transitions, are the part of the industry that IBM knows best. It knows better than anyone else how to make the pieces of the puzzle interlock.

The first thing to note about the scenario laid out so far is its apparent assumption of an easy, gradual transition from Sierra to Summit. This would seem to imply, for instance, that 3090 residual values and the attractiveness of used mainframes would maintain strong into the early 1990s, just as occurred through the early years of the 308X-3090 transition.

Maybe. There is one possible difference between the Summit and Sierra transitions that bears thinking about. A 3090 supported every operating system that could run on a 308X. It presumably ran everything faster, but it required nothing from the operating systems to do its work. At the performance levels that Summit must reach, however, this may no longer be true.

The XA architecture is still a luxury rather than a requirement; an XB architecture to support the new I/O architecture may be a sine qua non for adequate performance in database management, transaction processing, and other critical application areas at 300-500MIPS processor speeds. As a result, even if XB is a permissible upgrade path for 3090s, the break between generations would likely be sharper than we saw for 3090s.

Still, there don't seem to be any revolutionary changes planned for the Summit generation. The base technology remains in the same ballpark that IBM's been playing in for the 1980s, with TCM packaging and the like. There may eventually be a move to GaAs chips in Summit, but probably not at first.

As a result, price/performance curves will probably continue on the same path. Since the uniprocessor on which the Summit will be based is expected to run in the 45-50MIPS range, the price/performance of the "design point" Summit (the three-way system that would play the role of the 3090-200 in 1985) would

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come in at around $85-95,000/MIPS for a 120-130MIPS system.

The current expectation is that the high-end Summit would be a nine-way system available c. 1993 to run at a 350-400MIPS level. The reasoning here is that IBM's largest "leading edge" users would continue to grow at the same rate. The demand by slower-growing customers is harder to project, either by IDC or IBM; as a result, the timing of systems designed to fill in demand gaps — i.e., all but the design-point three-, six-, and nine-way systems and the fully tuned uniprocessors — must remain highly speculative.

A bigger question mark involves the nature of the break projected for the middle of the Summit generation that will differentiate it from the Sierras, as required by Mr. Barber's evolutionary schema. The best guess right now would be an extension of IBM's "clustering" ability, through memory-to-memory connections rather than channel-to-channel links, that would bring to multiple Summit systems near-single-image processing.

Summit Chronology: The View from the Valley

The timing of IBM announcements depends on a number of variables. Among this number, meeting the estimates of the consultant community ranks somewhere near (or below) the bottom. Witness the progressively redder faces of gurus who kept predicting the imminent arrival of the Sierra generation.

Still, not only is IBM more forthcoming than in years past, but historical experience with user demand — alongside financial concerns, probably the most important of the variables — suggests plausible scenarios for the development of the Summit generation. The variables are too many for this chronology to be more than a speculative guide, with maneuvering room of about half a year in any direction, but the ***Gray Sheet*** is persuaded by the general outline.

• Late 1989	Summit announcement: 120-130MIPS three-way processor and 210-220MIPS six-way processor.
• Mid-late 1990	First Summit shipments.
• Late 1990-Early 1991	Announcement of uniprocessor (40-45MIPS) Summit.
• Late 1992-Mid 1993	Nine-way (300-400MIPS) high-end Summit. Midlife kickers, based on bringing the basic uniprocessor to 65-75MIPS.
• c.1992-1993	The first significant distinctions between the Sierra and Summit generations, including (eventually if not immediately) direct memory-to-memory connections and application-optimized processors.
• 1991-1994/5	Announcement of two-, four-, five-, and eight-way Summits, and possibly detuned uniprocessors, to fill in price/performance gaps if and when demand exists or can be stimulated.
• 1994-1995	Price/performance gains, probably first through another group of midlife kickers, followed by a moderate (10%) price cut.
• c.1995	What's higher than a Summit?

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• **OR IS IT TELEREX?** In a move that makes sense even without its immediate context (to wit, Telex's interest in avoiding Asher Edelman's embrace), Memorex has put in a bid for Telex. After the Edelman-Datapoint bid was downgraded to $55 per share as a result of the Wall Street implosion, Memorex on December 6 submitted a friendly proposal of $56 in cash, $6 in securities. No official response to the Memorex bid is required before Saturday December 12, but the top brass of Telex immediately issued a statement affirming their belief that "the synergies resulting from a combination with Memorex would be advantageous to both companies and their customers."

The main synergy is size, necessary since the markets Memorex and Telex serve are already dominated by IBM. Beyond that, Telex has been generally stronger in the 3270 terminal market than Memorex, while Memorex still wins out in 3X terminal shipments. In the U.S., IDC estimates that Telex has had 15-16% shares of unit 3270 terminal shipments, compared to 4-5% for Memorex (IBM has a little over half the market); for 3X shipments, Memorex is running at about a 5% share, while Telex, which first began shipping product in this category in 1987, will wind up with around a 2% share (IBM has about three quarters of the market). Another area of synergy is geographic, since Memorex is in general stronger in Europe than in the U.S. (it slightly beat out Telex in European 3270 terminal shipments in 1986).

On the same day that the Memorex offer was received, the Telex board of directors voted in favor of "strongly recommending to Telex stockholders that they reject" the Edelman pitch, and cited as a major reason the determination by Drexel Burnham Lambert, the company's financial advisor, that the offer inadequately compensated stockholders. Drexel Burnham may soon have another role: Memorex may ask it to help with some of the financing for a merger with Telex, in conjunction with Morgan Guaranty Trust.

• **WANG BASES UNIX STRATEGY ON VIRTUAL MACHINE PRODUCT.** In the never-ending quest by proprietary midrange vendors to accommodate the user interest (U.S. government, etc.) in Unix without losing their installed base, market niches, or profit margins, Wang has come up with an intriguing angle.

Its new VS/VM product is reportedly the first major midrange implementation of a Virtual Machine architecture, similar to that seen on IBM and Amdahl mainframes. With VS/VM, which was under development for about five years, guest operating systems can run under the Wang proprietary operating system with about a 10% overhead. The initial use is VS IN/ix, Wang's version of Unix V, which in the future will only be available bundled with VS/VM. Wang has intimated that it is investigating the possibility of inviting other guests (Pick, maybe even that other VM) under the VS/VM roof.

• **TANDON SAYS TA-TA TO WINCHESTERS, TOO.** In 1985 Tandon began to reposition itself for a transition from the PC storage industry. The last major U.S.-based floppy vendor, it held on for as long as it could by suing Japanese companies for copyright infringement (one Japanese vendor just paid its first installment to Tandon in 3Q1987). Recently it has tried to keep pace in the hard disk market by extremely aggressive (some thought below-cost) pricing against Seagate. For the past two years, though, the emphasis has gone into developing PCs, first an XT clone sold as the Tandy 1200 and then its own brand-name systems. By 3Q1987, disk drives accounted for less than a third of Tandon revenue. On December 7, Tandon sold all assets in its disk drive operations to Western Digital for $40-45 million.

• **TECHNOLOGY TRANSFERS.** Obviously some of the Japanese graduates from U.S. computer science programs are returning to Japan with a twist of American programmers' humor as well as expertise. Among new Fujitsu products are YAC II (Yet Another Control Chart II) and BAGLES (Banking Application Generators Library for Extensive Support).

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THE GRAY SHEET
Computer Industry
REPORT

DONALD BELLOMY, EDITOR DECEMBER 4, 1987 • VOL. 23, NO. 13 PATRICK J. MCGOVERN, PUBLISHER

Strong Rebounding — Except They Changed the Game

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After reading too often about the Celtics losing because of weak rebounding and other aspects of the inside game, you learn that Kevin McHale is back in the lineup, and that Larry Bird is no longer operating under the delusion that he's Michael Jordan and is letting his Achilles tendons heal without trying to dribble behind his back any more. So you rush over to Boston Garden — only to find they're playing hockey tonight, and there's blood on the ice.

That's roughly what has happened in the computer industry. The third quarter was overall the best showing by companies in the field since the Great Softness began three years ago, but the good news has been overshadowed by the uncertainty stemming from Mad Monday.

The computer systems vendors in the group of companies whose fortunes the *Gray Sheet* has been tracking this year put on a burst of speed after a half year of jogging. The roughly 30 companies in this part of the sample had revenue growth of 7.9% during each of the first two quarters of the year; in 3Q1997, revenue grew 11.4% over 3Q1986. After net income grew 9.7% and 9.1% during the first two quarters, it jumped 37.2% in the third.

The third quarter results for the systems vendors brace the year to date. Revenue for January-September 1987 in this category is up 9.1%; aggregate net income is up a solid 18.2%.

The overall sample has required adjustments due to the consolidation rampage. UCCEL's name is missing, now that it is officially part of Computer Associates; however, its revenue and income are reflected in the Computer Associates totals. Alas, the acquisition of Bridge by 3Com could not be incorporated so easily due to incommensurate reporting periods. Bridge has therefore been removed from the sample.

Finally, Xebec has still not reported financial results for the July-September quarter, the last of its fiscal year. The auditors are reportedly still going over the figures.

Consequently, data from previous quarters in the year-to-date table inside subtract both Bridge and Xebec. The differences are trivial except for Xebec's $34 million loss in the second quarter. For the first half of 1987, the peripherals/communications section would have grown 32.3% over 1986 rather than the 30.8% reported in the August 30 issue (Vol. 23, No. 8), while the net income would have increased 73.4% rather than 46.3%. There would be no difference in the 10.1% first half growth in revenue for the whole sample, while the total net income would have grown 21.2% rather than 20.3%.

Now that the brushwood is cleared away, we can get to the total revenue and income gains for all reporting companies in the sample: for the third quarter, revenue up 13.6%, compared to gains of 10.3% and 10.0% in the first two quarters, and net income up 59.3%, in contrast to gains of 23.8% and 19.1%.

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The results for the year to date are impressive (even if the real message, particularly on the bottom line, is how bad 1986 was): revenue for all reporting companies in the sample was up 11.3%, and net income up 32.6%.

Because IBM has been trailing the industry as a whole throughout 1987, it remains useful to see how the sample is doing without IBM. Although IBM's third quarter was in many respects an improvement over the first two of 1987 (see the issue of October 30, Vol. 23, No. 11), the other companies as a whole were doing even better.

As a result, without Armonk's big blues, the computer systems segment of the sample would be up 15.7% in revenue for the quarter, and 84.4% in net income. The whole sample would be up 18.2% in revenue for 3Q1987, and up 153.5% in income.

For the year to date, without IBM, the computer systems segment would be up 12.3% in revenue, and up 66.1% in net income. Revenue for the sample as a whole would have increased 15.1%, and net income would have almost exactly doubled (up 100.1%).

There is another subtraction that can add a useful perspective to the sample. Any accounting of Unisys results is bound to be apples to oranges in one respect or another. Unisys statements for the first two quarters included money accrued by both the Burroughs and Sperry segments of the company in 1987, but contrasted it only to what Burroughs took in during the previous year. The *Gray Sheet* has therefore included Sperry 1986 results in its sample.

On the other hand, Sperry last year included business units that Unisys has since sold off. The result is that counting Sperry brings 1987 Unisys revenue below the 1986 (Unisys)Burroughs-Sperry total, as occurred for Unisys itself when for the first time it counted two-thirds of Sperry 1986 revenue in the third quarter (the other third, reflecting Sperry money accrued until Unisys assumed control, has never been reported by anybody). Yet if Unisys takes a hit on revenue comparisons from this vantage point, it makes out in the income column, since it has been managing the Sperry revenue better than Sperry did, and/or the "power of two" shows up most clearly in cost cutting.

In any case, it may be useful to look at the totals without Unisys or Sperry, since there is no easy solution to the conundrum. Without them, the third-quarter revenue gain for the computer systems segment was 13.6% rather than 11.4%, and the income gain 33.6% rather than 37.2%. The whole sample would have gained 15.6% in revenue over the first three quarters of 1986 rather than 13.6%, and 56.4% in income rather than 59.3%.

For the year to date without Unisys or Sperry, revenue would have been up 11.8% rather than 9.1% in the computer systems segment, and income up 17.3% rather than 18.2%. For the entire sample, revenue would have gained 13.8% rather than 11.3%, and income 32.5% rather than 32.6%.

The *Gray Sheet* has tried to include Unisys because it is, after all, the third largest computer vendor, but the big stories continue to be the fortunes of the top two. Comparisons are a bit difficult due to Digital's recent redefinition of sales in its financial reports, but the combination of IBM's hardware sales and program products has grown only 8.7% in 1987, while for the year to date Digital sales (roughly hardware plus software) are up 22.6%.

IDC will break out the market shares for the value of hardware shipments early next year, but it's already clear that IBM will have again lost share in every category except (probably) large-scale systems, with the worst hit occurring in the midrange. The relative positions of IBM and DEC among the computer systems vendors in the *Gray Sheet* sample are an early warning signal:

- IBM's share of the total revenue of the segment has dropped from 47.1% through the first three quarters of 1986 to 45.6% for the same period this year. Digital's meanwhile has risen from 8.4% in 1986 to 9.6%.

continued on page 3

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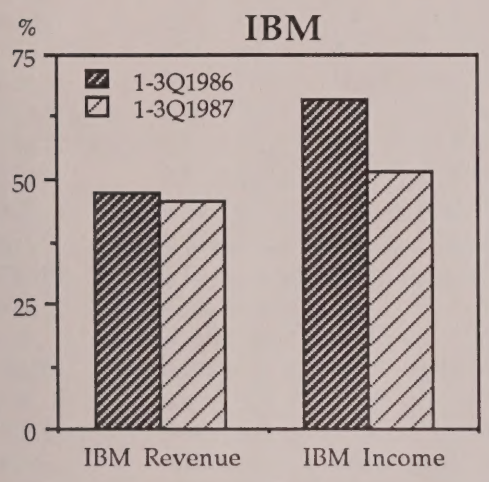
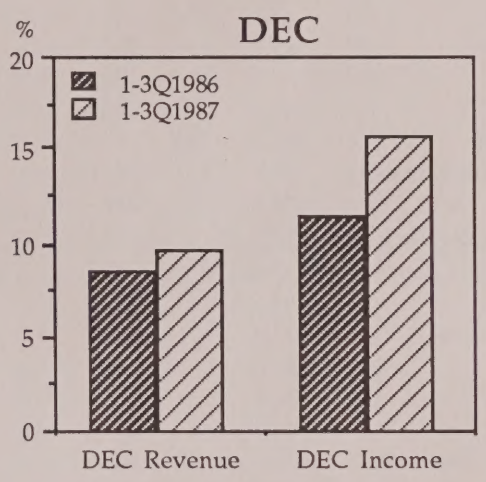
IBM & DEC Proportion of 1-3Q1987 vs. 1-3Q1986 Revenue and Net Income of Computer Systems Vendor in the Gray Sheet Sample

(Source: International Data Corporation, 1987)





- As important as the revenue trends as an index of future potential (not to mention recent stock prices) is the different directions that profits have been taking. Over January-September 1986 IBM represented almost two-thirds (65.7%) of the aggregate net income of the segment, while for the same period in 1987 it is down to a little over half (51.9%). Digital, though, has moved from 11.4% of computer systems vendors' net income to 15.6% for the first three quarters of 1987.

The midrange has been very, very good for Digital, but then it's been alright for most vendors specializing in submainframe multiuser systems except for IBM and Data General, whose equipment sales are down 4.8% so far in 1987. NCR's net sales have grown 19.2% during the first three quarters, HP equipment revenue (including information systems) was up 14.2% in the February-October period, while Tandem's product revenue has increased 34.6% so far in 1987.

Total 1987 revenue gains for midrange vendors that don't break out types of revenue include 22.6% for Altos, 23.7% for CCI, 15.4% for MAI Basic Four, 10.3% for Prime, 31.0% for Pyramid, 44.6% for Stratus, and 13.1% for Wang.

The engine for overall market growth in 1987, though, will be PCs. The PS/2 is no slouch, with over one million shipments so far, but IBM's rivals among the traditional leaders in PC sales are luxuriating in their best growth in years. Compaq revenue is up 80.7% so far this year, while Apple is growing at a 46.1% clip. Outside of the *Gray Sheet* sample, Zenith's computer systems and components division has seen its revenue double (up 99.6%).

Personal computer growth continues to generate spillover revenue gains in other segments. Although Tandon's revenue in fact is now based much more on PC sales than on storage, most of the PC peripheral vendors are doing okay except for Cipher Data. One interesting third-quarter result was that, while Microsoft continues to lead Lotus by a length for the year as a whole, Manzi's minions managed to pull almost even with the Gates mates in 3Q revenue.

So what does it all mean? Well, think about how these companies would look after Mad Monday if they weren't doing so much better than last year.

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Selected Information Industry Financial Results, Third Quarter 1987

(Source: Company Financial Reports)

Category/ Company	3Q/87 Rev. ($M)	3Q/86 Rev. ($M)	% Change	3Q/87 Earn. ($M)	3Q/86 Earn. ($M)	% Change
Computer Systems						
Alliant	14.2	18.6	65.7%	0.8	1.3	-38.7%
Altos	40.6	32.6	24.5%	2.2	1.3	72.0%
Amdahl	362.7	220.0	64.9%	36.8	7.1	417.3%
Apollo	135.0	100.4	34.5%	(2.9)	2.5	NA
Apple	786.4	510.8	54.0%	71.7	32.9	117.9%
Compaq	313.5	147.2	112.9%	36.4	8.7	318.6%
Computer Consoles	37.8	34.0	11.2%	0.6	1.6	-62.5%
Control Data	831.4	818.5	1.6%	6.8	(9.3)	NA
Convergent Tech	111.3	64.7	71.9%	2.0	(25.7)	NA
Convex	18.4	10.7	72.3%	2.2	1.1	94.9%
Cray	184.6	136.6	35.2%	36.1	26.13	8.3%
Data General*	332.3	330.1	0.7%	(22.6)	(26.3)	NA
Digital	2,529.8	2,038.5	24.1%	269.9	182.6	47.8%
Gould*	230.4	227.4	1.3%	(0.3)	4.3	NA
Harris	514.3	477.2	7.8%	19.9	16.3	22.5%
Hewlett Packard*	2,279.0	1,933.0	17.9%	218.0	157.0	38.9%
IBM	12,727.0	11,910.0	6.9%	1,208.0	1,077.0	12.2%
Kaypro	20.5	22.7	-9.8%	(10.9)	0.9	NA
MAI Basic Four	91.9	75.7	21.4%	7.0	5.6	26.1%
Masscomp	20.3	16.0	27.2%	1.4	0.9	53.0%
NBI	63.4	72.1	-12.2%	(3.3)	(0.6)	NA
NCR	1,339.5	1,176.9	13.8%	97.8	73.4	33.3%
Prime	236.2	221.9	6.5%	15.9	12.1	31.5%
Pyramid	15.8	11.0	43.3%	1.0	(1.9)	NA
Silicon Graphics	28.9	16.3	77.2%	3.0	1.7	70.4%
Sperry*	NA	NA	NA	NA	NA	NA
Stratus	48.8	32.1	52.0%	5.3	3.5	51.1%
Sun Microsystems	191.7	91.9	108.5%	12.9	6.7	93.2%
Tandem	291.1	220.6	32.0%	30.4	21.6	41.1%
Tandy	838.2	742.6	12.9%	64.3	43.7	47.0%
Unisys*	2,223.2	2,423.0	-8.2%	129.7	52.9	145.2%
Wang	693.0	597.0	15.9%	22.5	(30.0)	NA
Subtotal	27,551.2	24,720.9	11.4%	2,262.7	1,649.1	37.2%
Peripherals and Communications*						
Alloy	11.0	10.1	8.9%	0.5	0.5	7.9%
AST Research	78.6	40.2	95.4%	0.1	3.1-	97.7%
Britton Lee	7.7	7.8	-1.5%	(0.3)	0.1	NA
Cipher Data	39.3	44.8	-12.2%	0.7	1.0	-33.2%
Dataproducts	80.6	84.5	-4.6%	(6.7)	2.7	NA
Emulex	28.8	25.0	15.0%	1.6	1.6	2.6%
Irwin Magnetic Sys	11.2	11.8	-5.4%	0.5	0.9	-46.1%
Key Tronic	25.7	20.2	27.7%	0.7	(2.3)	NA
Maxtor*	60.4	41.8	44.6%	1.2	5.9	-79.3%
Micropolis	75.2	55.4	35.7%	7.0	4.9	43.0%
Miniscribe	103.8	47.9	116.7%	8.4	6.1	38.5%

**DG 3Q results include Digityne (1987) and Fairchild (1986) settlements:; 3Q1987 Gould income $4.8M before discontinued operations and extraordinary charge due to reversal of tax loss carryforwards; HP for the quarter ending Oct. 31; two-thirds Sperry 3Q1986 results in Unisys, the rest not reported.*

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Category/ Company	3Q/87 Rev. ($M)	3Q/86 Rev. ($M)	% Change	3Q/87 Earn. ($M)	3Q/86 Earn. ($M)	% Change
Network Systems	33.8	27.1	24.5%	5.8	4.6 2	6.3%
Priam	31.1	27.3	14.2%	(2.5)	(4.8)	NA
Quantum*	49.5	29.6	67.1%	4.1	2.7	49.4%
Rexon	28.2	12.9	118.5%	2.8	0.7	332.6%
Seagate	226.1	189.0	19.6%	14.8	24.5	-39.5%
Storage Tek	185.9	178.5	4.1%	1.4	9.1	-84.6%
Tandon	96.7	56.4	71.6%	1.0	(45.3)	NA
Ungerman-Bass	38.2	29.8	28.2%	1.8	1.2	59.2%
Western Digital*	140.1	94.7	48.0%	12.2	7.7	58.8%
Wyse	102.6	62.7	63.6%	7.1	4.4	60.1%
Subtotal	1,454.6	1,097.6	32.5%	62.2	29.1	113.6%
**Bridge removed from sample due to acquisition by 3Com; Maxtor 1986 results reflect U.S. Design acquisition; 3Q1987 Quantum income includes $2.975M NEC settlement; Western Digital figures reflect Faraday and Paradise acquisitions.*						
Software/Services/VARs						
Ask Computer	26.6	20.3	30.8%	1.9	1.8	6.0%
ADP	361.3	321.1	12.5%	30.4	22.7	33.9%
Boole & Babbage	12.1	9.4	29.6%	0.7	0.3	115.5%
Comdisco	327.3	253.8	29.0%	31.9	19.1	66.6%
ComputerAssociates*	168.3	96.1	75.1%	16.0	6.1	161.7%
Computer Sciences	281.3	249.4	12.8%	9.9	7.2	38.1%
Computervision	132.3	125.9	5.1%	1.5	1.2	29.4%
Cullinet*	49.1	35.9	36.8%	(5.8)	(6.8)	NA
Cybertek	5.9	6.4	-8.4%	0.2	0.4	-56.5%
Daisy Systems	27.6	25.0	10.3%	0.5	(0.9)	NA
Data I/O	15.8	15.8	0.3%	(0.2)	0.9	NA
Informix	11.4	5.7	100.1%	1.9	0.7	163.5%
Intellicorp	5.1	4.1	23.9%	(0.6)	(0.9)	NA
Intergraph	157.1	151.0	4.1%	18.4	15.5	18.6%
Interleaf	12.7	8.6	48.4%	1.3	(0.3)	NA
Lotus	101.2	65.7	54.1%	19.1	9.5	100.8%
MSA*	56.8	38.8	46.4%	(6.6)	0.3	NA
Mentor Graphics	56.0	45.0	24.3%	5.3	2.9	82.8%
Microsoft	102.6	66.8	53.7%	21.3	15.8	34.3%
Software Pub.	10.7	6.4	67.2%	1.5	0.5	200.0%
Symbolics	24.0	23.5	2.1%	(4.5)	(18.6)	NA
VM Software	6.0	6.0	0.0%	0.2	0.8	-78.6%
Subtotal	1,951.1	1,580.5	23.4%	144.1	78.4	83.8%
**Computer Associates includes UCCEL 3Q results adjusted to CA policies; Cullinet for quarter ending Oct. 31; MSA 1987 revenue gain/income loss primarily due to accounting change.*						
Semiconductors/Components						
AMD*	260.9	229.1	13.9%	(53.8)	(43.0)	NA
Chips & Tech.	29.6	13.4	120.3%	4.7	2.3	107.4%
Cypress	20.91	4.4	44.5%	3.2	2.3	37.2%
Intel	501.1	324.1	54.6%	80.5	(114.2)	NA
LSI Logic	68.9	46.5	48.0%	3.2	(1.3)	NA
Texas Instruments	1,416.3	1,248.9	13.4%	69.1	14.0	393.6%
Subtotal	2,297.7	1,876.6	22.4%	107.0	(140.0)	NA
**AMD results restated to reflect acquisition of Monolithic Memories.*						
TOTAL	**33,254.5**	**29,275.5**	**13.6%**	**2,576.0**	**1,616.6**	**59.3%**

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Selected Information Industry Financial Results, First-Third Quarters 1987

(Source: Company Financial Reports)

Category/ Company	1-3Q/87 Rev. ($M)	1-3Q/86 Rev. ($M)	% Change	1-3Q/87 Earn. ($M)	1-3Q/86 Earn. ($M)	% Change
Computer Systems						
Alliant	39.6	18.5	113.8%	5.0	2.5	103.1%
Altos	121.5	99.1	22.6%	8.0	5.2	53.8%
Amdahl	1,022.2	629.6	62.4%	93.0	12.2	660.0%
Apollo	390.7	270.8	44.3%	11.2	4.1	175.5%
Apple	1,998.8	1,368.0	46.1%	159.0	97.0	63.9%
Compaq	791.9	438.4	80.7%	87.3	26.7	227.3%
Computer Consoles	109.2	88.3	23.7%	2.3	(4.9)	NA
Control Data	2,439.0	2,443.1	-0.2%	8.5	(38.3)	NA
Convergent Tech	308.4	228.4	35.0%	(8.7)	(28.4)	NA
Convex	49.5	27.3	81.5%	6.5	2.6	152.0%
Cray	523.7	458.5	14.2%	113.0	101.5	11.3%
Data General	961.1	974.2	-1.3%	(130.3)	(30.1)	NA
Digital	7,608.9	6,142.4	23.9%	954.8	591.6	61.4%
Gould	690.5	681.4	1.3%	10.8	(106.4)	NA
Harris	1,606.8	1,581.5	1.6%	68.0	48.5	40.4%
Hewlett Packard*	6,350.0	5,505.0	15.3%	528.0	407.0	29.7%
IBM	36,206.0	34,305.0	5.5%	3,171.0	3,399.0	-6.7%
Kaypro	75.6	63.8	18.5%	(10.9)	2.5	NA
MAI Basic Four	249.0	215.9	15.4%	19.2	13.6	41.1%
Masscomp	61.8	45.6	35.5%	5.7	2.2	154.6%
NBI	199.7	213.3	-6.4%	(4.6)	(5.7)	NA
NCR	3,820.6	3,306.5	15.5%	257.9	202.5	27.4%
Prime	693.9	629.2	10.3%	43.5	32.8	32.7%
Pyramid	42.1	32.1	31.0%	2.3	(3.1)	NA
Silicon Graphics	80.5	41.0	96.4%	9.2	3.4	167.1%
Sperry*	0.0	3,026.5	NA	0.0	122.1	NA
Stratus	129.0	89.2	44.6%	12.9	9.8	30.8%
Sun Microsystems	519.3	226.2	129.6%	34.0	15.6	118.3%
Tandem	797.5	597.7	33.4%	78.5	52.1	50.6%
Tandy	2,351.8	2,126.8	10.6%	159.0	119.8	32.8%
Unisys*	6,914.0	4,896.6	41.2%	361.1	145.1	148.9%
Wang	2,262.9	2,000.0	13.1%	60.4	(24.0)	NA
Subtotal	79,396.7	72,769.8	9.1%	6,115.5	5,171.8	18.2%
**HP for the quarter ending Oct. 31; two-thirds Sperry 3Q1986 results in Unisys, the rest not reported.*						
Peripherals and Communications*						
Alloy	33.9	29.3	15.75	2.1	1.3	60.3%
AST Research	174.1	144.9	20.1%	7.5	12.4	-39.3%
Britton Lee	18.7	22.5	-16.7%	(6.5)	0.1	NA
Cipher Data	127.5	135.6	-6.0%	3.0	6.6	-53.7%
Dataproducts	243.0	265.9	-8.6%	(4.7)	10.6	NA
Emulex	81.9	80.1	2.2%	3.1	6.0	-47.9%
Irwin Magnetic Sys	37.3	32.2	15.7%	2.5	3.4	-27.6%
Key Tronic	88.5	82.6	7.2%	3.2	(2.7)	NA
Maxtor*	165.3	102.3	61.6%	10.9	14.0	-22.0%
Micropolis	207.9	161.3	28.9%	20.1	13.1	53.0%
Miniscribe	246.3	132.0	86.6%	22.1	16.4	35.1%
Network Systems	84.67	7.2	9.6%	11.9	11.5	3.6%

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Category/ Company	1-3Q/87 Rev. ($M)	1-3Q/86 Rev. ($M)	% Change	1-3Q/87 Earn. ($M)	1-3Q/86 Earn. ($M)	% Change
Priam	102.4	91.9	11.4%	(5.2)	(6.8)	NA
Quantum	121.6	82.6	47.2%	3.5	12.1	-71.3%
Rexon	80.1	41.5	92.9%	7.6	2.4	221.7%
Seagate	743.2	457.5	62.4%	92.4	52.7	75.4%
Storage Tek	541.8	511.7	5.9%	24.5	27.9	-12.3%
Tandon	258.9	166.3	55.6%	11.7	(63.6)	NA
Ungerman-Bass	105.5	78.6	34.3%	4.2	(1.9)	NA
Western Digital*	402.4	259.1	55.3%	40.3	22.7	77.6%
Wyse	260.6	161.6	61.2%	17.9	12.1	47.7%
Subtotal	4,125.4	3,116.9	32.4%	272.1	150.1	81.2%

**Bridge removed from sample due to acquisition by 3Com; Maxtor 1986 results adjusted to reflect U.S. Design acquisition; Western Digital figures reflect Faraday and Paradise acquisitions.*

Software/Services/VARs						
Ask Computer	83.4	64.5	29.3%	6.1	5.21	8.5%
ADP	1,090.3	963.9	13.1%	109.7	85.52	8.4%
Boole & Babbage	32.4	26.7	21.6%	1.7	0.9	83.6%
Comdisco	875.2	720.2	21.5%	85.9	55.3	55.3%
ComputerAssociates*	452.5	270.6	67.2%	42.3	18.3	131.4%
Computer Sciences	846.4	720.2	17.5%	30.2	22.7	33.1%
Computervision	408.7	358.2	14.1%	11.4	(9.2)	NA
Cullinet*	159.2	124.7	27.7%	(17.9)	(14.5)	NA
Cybertek	17.4	20.3	-14.3%	0.2	1.9	-89.0%
Daisy Systems	75.5	70.6	6.9%	(15.0)	(7.4)	NA
Data I/O	49.34	8.6	1.5%	1.4	3.4	-59.6%
Informix	27.7	14.5	91.3%	3.9	1.5	154.0%
Intellicorp	16.4	14.9	9.7%	(3.3)	3.6	NA
Intergraph	445.8	448.4	-0.6%	45.1	50.8	-11.2%
Interleaf	35.1	21.8	60.6%	2.7	(1.1)	NA
Lotus	280.0	201.0	39.3%	49.1	32.7	50.1%
MSA*	192.8	115.8	66.6%	(68.4)	5.8	NA
Mentor Graphics	160.4	124.2	29.1%	14.2	7.1	100.8%
Microsoft	300.8	179.2	67.8%	57.6	38.0	51.8%
Software Pub.	29.9	16.7	79.0%	4.0	0.1	2,997.7%
Symbolics	77.8	86.1	-9.6%	(7.9)	(13.4)	NA
VM Software	19.1	16.6	15.2%	1.1	2.5	-55.9%
Subtotal	5,643.9	4,629.3	21.9%	409.0	292.9	39.7%

**Computer Associates includes UCCEL 3Q results adjusted to CA policies; Cullinet for quarter ending Oct. 31; MSA 1987 revenue gain/income loss primarily due to accounting change.*

Semiconductors/Components						
AMD*	734.5	630.9	16.4%	(45.4)	(77.7)	NA
Chips & Tech.	79.9	24.9	221.5%	12.3	4.4	178.3%
Cypress	52.9	36.1	46.7%	9.4	9.4	-0.3%
Intel	1,334.6	909.4	46.8%	152.5	(156.7)	NA
LSI Logic	183.9	139.8	31.5%	5.6	2.1	159.7%
Texas Instruments	4,059.8	3,638.3	11.6%	214.8	2.5	8,492.0%
Subtotal	6,334.6	5,285.1	19.9%	341.6	(215.9)	NA

**AMD results restated to reflect acquisition of Monolithic Memories.*

TOTAL	**95,500.6**	**85,801.2**	**11.3%**	**7,138.1**	**5,382.0**	**32.6%**

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Digital Networks with M.I.T., But Gets a Bad Connection

As many readers probably know, the *Gray Sheet* and *Computerworld* are corporate cousins. In fact, the *Gray Sheet* was founded by Pat McGovern three years before he established the most famous publication in the computer industry. It therefore hurts when *Computerworld* trips on a headline.

Also, the *Gray Sheet* has been following Digital's success story over the past two years with attention and admiration. There's an extra sting, then, when Digital does something unnecessarily and obviously self-serving.

And the *Gray Sheet's* current editor has a particular fondness for MIT, a source of friends as well as guidance. It therefore seems almost a personal insult when an MIT professor allows himself to look unprofessional.

All three disappointments can be seen in the contents teaser on p.1 of the November 30 *Computerworld*: "DEC buys into a nifty study showing how great it stacks up against IBM on network operating costs." DEC may indeed stack up really great against IBM on network operating costs, but the study, conducted by the Index Group, Inc., in collaboration with Prof. Michael Treacy of the Sloan School of Management at MIT, is so far from being "nifty" that it inadvertently raises questions about Digital's current competitive position.

On November 24, Digital conducted a telephone press conference to tout the results of the study, admittedly "initiated by [translation: paid for by] Digital," on the five-year cost of ownership of Digital vs. IBM networks in corporate "backbone" environments, multiple field offices, and manufacturing sites. After attempting to identify networks of comparable functionality, the study then factored in acquisition and five-year operation costs of equipment, software, personnel, communications, and facilities.

Surprise, surprise: Digital looked good. For example, the price range for adding a user to the network for Digital was $115-160, but for IBM $583-700.

But then, even setting aside questions of bias (the *Gray Sheet* just wishes Prof. Treacy's work appeared impartial), the study is a weak reed to lean on. There are sometimes, in fact too often, conceptual or statistical flaws in market research, including IDC's, but research designed by PhDs is supposed to be solid, sophisticated, and scholarly. This ain't.

- Prof. Treacy himself admitted, when asked by the *Gray Sheet*, that the sample is hardly wide enough to be representative. The study is concerned with only 17 sites of 14 corporations in the Fortune 500, which are further subdivided into the three subcategories (e.g., corporate "backbone" environment figures are based on just three companies). Nevertheless, cost/user figures are given to the closest dollar, and other figures are given to the tenth of a percentage point.

- Many costs are apparently not real expenditures but Treacy's estimations. Thus salaries are derived from *Datamation* national averages to avoid regional biases (a larger sample could have allowed real numbers), and the hardware prices are not what customers actually paid, but what it was decided comparable systems from the same vendors would cost today.

And so on. Many of the results seem intuitively reasonable (i.e., that the real costs come after you "pay" for installing a network), but the study just does not permit the level of granularity necessary to support the statements made about Digital vs. IBM. If IDC were ever forced by whatever exigencies to derive data of such dubiety, Digital would (rightly) be among the first to complain.

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THE GRAY SHEET
Computer Industry
REPORT

DONALD BELLOMY, EDITOR NOVEMBER 24, 1987 • VOL. 23, NO. 12 PATRICK J. MCGOVERN, PUBLISHER

High-Octane Processing and the Two Cultures: The Differences Persist

The marquee still reads "No, No Nanosecond," but rehearsals are already being scheduled. In announcing the renewal of Seymour Cray's contract through 1992, Cray Research has intimated that by then he should be working on the Cray-4, which would be targeted at a one nanosecond clock.

As the thousands of people know who have received one of those nanosecond wires from Admiral Grace Hopper, supercomputer clocks couldn't get much faster without repealing the law of relativity that ordains the speed of light as an absolute limit. Cray's project also underscores one of the differences between ultrahigh-performance computers for the scientific/engineering community and systems designed for commercial processing. Nanoseconds are always nice, but the real MIS bottlenecks are in the application software.

A quarter of a century ago, when C.P. Snow depicted the sciences and the humanities as "two cultures" that had lost the ability to communicate with each other, few would have predicted that the computer industry was about to undergo an analogous bifurcation. Computer manufacturers were already differentiating pure number-crunching boxes from commercial systems, but the same vendors were producing both (IBM, Univac, et al.). It was less a matter of separate classes of systems than different points on a spectrum.

In the 1960s, the spectrum divided. New vendors like CDC specialized in numerically intensive computing, while minis and superminis were reshaping other segments of the scientific/engineering market. By the early 1980s, thanks to the technological and entrepreneurial vision of innovators like Seymour Cray and Bill Poduska, supercomputers had become a market unto themselves, while the engineering work-station had become the single-user solution to technical computing.

By the late 1980s, there are some signs that the circle may be closing again. There is more interest today among commercial customers in computers originally designed for the fraternity of techies than at any time in the past quarter century. However, except for a few applications and a few low-end products, the *Gray Sheet* believes that most of the momentum is currently vendor- rather than customer-driven.

Sometimes user interest in technical computing stems from a desire to integrate disparate corporate activities (as the cliche goes, "islands of computing"), as when CIM promises to tie together mainframes, departmental systems, technical workstations, PCs, and shop floor controllers to integrate the manufacturing process. There are two catches, though, as GM has learned: linking technical and commercial computing requires advances in networking and standardization that don't yet exist, and (ergo) it costs mounds of money.

Sometimes customer interest stems from performance and/or price/performance considerations. When Apple bought a Cray supercomputer, it was to accelerate the design process and therefore enhance its competitive position. Here the initial investment was high, but time was the critical variable.

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Supercomputers and Their Kith and Kin: A Lexicon

The rule-of-thumb definition of supercomputers still holds — whatever happens to be the currently fastest group of computers specially designed for number-crunching as opposed to commercial processing, where the demand these days is likely to be for database manipulation and/or transaction processing. However, technology has bred alternative approaches to high-performance processing with distinct system architectures and pricing structures.

High-performance processors are a subclass within two IDC classifications — large-scale and medium-scale systems. Within large-scale systems there are two high-performance categories:

- **Supercomputers** are systems characterized by very high computational and floating point performance (generally 50+ MFLOPS peak), vector capability, and pricing that generally starts at $1 million and ranges upward. Examples are the Cray X-MP and Cray-2, Control Data's Cyber 205 and ETA-10, and Amdahl's 500 series.
- **High-Performance Mainframes** are typically a mainframe vendor's largest and most powerful models with special vector capabilities. Examples would be IBM's 3090 series with Vector Facility, NAS's AS/XL V series, and the Unisys (formerly Sperry) 1190 ISP.

Two other categories fall into the medium-scale classification based primarily on pricing:

- **Minisupercomputers** are systems characterized by high performance (10+ MFLOPS), vector capability, and pricing that generally ranges from $100,000 to $1 million. Examples include Alliant's FX family, Convex's C-1, Floating Point Systems' M64 series, and Multiflow's TRACE series.
- **High-Performance Parallel Processors** are systems with a high or very high performance capability that utilize a massively parallel architecture (generally 16 or more processors — if typically under 16, as with Alliant or Encore, they are classed with minisupers). Price ranges are extremely wide, from tens of thousands of dollars to over $1 million. Examples would be BBN's Butterfly, Intel's iPSC-VX, Saxpy's Matrix series, and Thinking Machines' Connection Machine.

The more typical situation, though, is to segment numerically intensive aspects of a job (e.g., financial modeling) or other high-performance applications (e.g., desktop publishing) and make use of price/performance gains in technical computing — in other words, workstations.

At this point in time, the technical workstation is the nexus of demand-driven technical/commercial convergence, at least in the U.S. The *Gray Sheet* suspects that there is also an element of vanity involved when an investment house, say, buys a bunch of Sun workstations rather than PS/2s or DeskPro 386s, but oneupmanship is justifiable only if the cost differential is minimal.

Above the workstation level, the technical and commercial markets have barely begun to inch towards one another. Although vendors specializing in the midrange technical market often start off visits to IDC by stating that they are now starting to focus on the commercial user, ten minutes into the presentation the discussion is again exclusively about technical applications.

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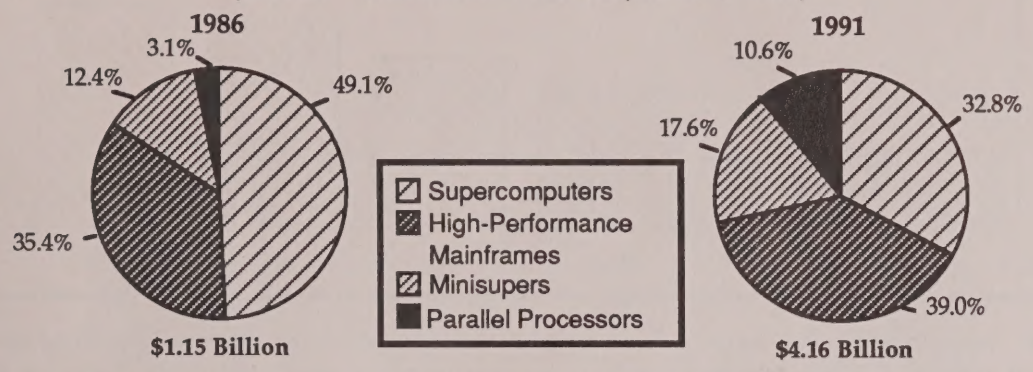
Sector Shares of the Value of High-Performance Systems Shipped By U.S.-Based Vendors, 1986 and 1991

(Source: International Data Corporation, 1987)



Moreover, many of the technologies involved remain recondite, while the vendors are small and often ephemeral. Some, like Culler, have already died (Culler's technology has been purchased by Saxpy Computer), while others, like Elxsi, seem to be sputtering. Others take their place, most notably in 1987 Multiflow, which has made a dent in the minisuper market despite a technology (compilers packing data into verrrrrrrrry long instruction words) that is unique and difficult to explain to outsiders.

Although, like other vendors in its class, Multiflow hopes to appeal to outsiders in the commercial universe, right now it can get by talking to insiders within the techie community. And even here, corporate size, marketing constraints, and the installed base of applications on traditional mini/supermini systems impose limits. Some DEChands worry that, in Digital's assault on IBM's stronghold in commercial processing, it is leaving its scientific/engineering flank open to minisuper vendors like Convex, Alliant, and Multiflow, but so far the threat, while growing, has been contained.

Underscoring the degree to which market penetration is still limited:

- IDC estimates that the two high-performance categories in the medium-scale market (minisupers and parallel processors) only accounted for 1.2% of the value of worldwide medium-scale systems in 1986; the proportion should still be well below 2% in 1987.

- For the two high-performance categories in the large-scale market (supercomputers and high-performance mainframes), the proportion of the value of shipments in 1986 was higher (5.5%), but not earthshaking; this year the figure should be around 7%.

- Overall, the high-performance market accounted for 2.5% of the value of multiuser systems shipped last year, and a tad over 3% of 1987 shipments.

Nevertheless, despite this paltry showing, another convergence is occurring: even as high-performance vendors attempt to break out of the techie ghetto into the WASP world of commercial processing, commercial vendors, most notably IBM, are attempting to reclaim a share of the technical market to which they had been paying short shrift for nearly two decades.

There seem to be two reasons for this reversal. One source for the vendor-driven convergence of commercial and technical high-performance computing is the degree of interest, if not current purchases, shown by commercial users, and vendors' fear that number-crunching functionality could become a checklist item in future system purchases.

continued on page 4

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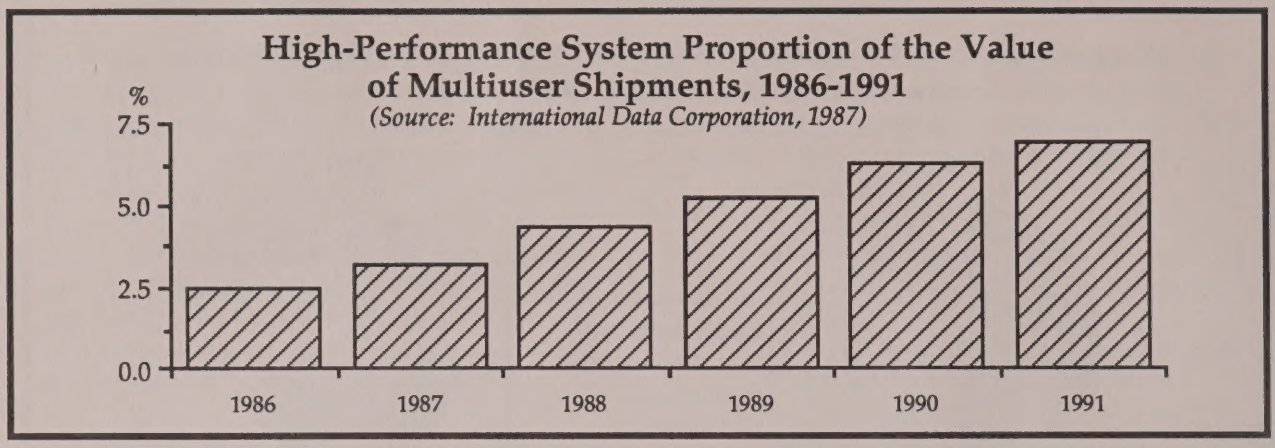

The other reason is much more critical: when you add commercial to technical demand, including federal government purchases, you get a market with a growth potential lacking in most other sectors of the industry.

- The two large-scale categories of high-performance systems are expected to show a combined 1986-1991 compound annual growth rate of 25% in the value of worldwide shipments; the comparable figure for all large-scale system shipments is 3%.

- The two medium-scale categories can look forward to a combined 1986-1991 CAGR of some 46%, compared to 7% for the whole medium-scale market.

- By 1991, then, high-performance systems should account for around 15% of the large-scale market, 5.5% of the medium-scale market, and 7% of the total multiuser systems market.

These projections suggest different market dynamics for high-performance systems in the two size categories. Minisupers and parallel processors are in high-growth startup mode; real money won't start pouring in for several years.

By then, IDC expects old-line medium-scale players like Digital and IBM to have minisuper-style products. A degree of convergence of the traditional and high-performance sectors of the medium-scale market will begin at that point.

Some of today's cadre of midscale high-performance vendors are in training as survivalists. Alliant and Encore, for example, are already on a second generation of products designed to offer more attractive price/performance and upgrade options. However, it is too early to tell who will have the right mixture of technology, manufacturing efficiency, software development, marketing acumen, and financial stability to make it. Four-year-old Encore, after all, is only now contemplating the possibility of a profitable quarter.

The high-performance market in the large-scale category is more mature. However, the anticipated growth rates for high-performance large-scale systems are even more disproportionate compared to the overall large-scale market than the projection for the high-performance subset of the medium-scale market is to the larger market of which it is part. For the next few years, then, the large-scale market will be the primary focus of multiuser vendors' efforts to effect a higher degree of technical and commercial convergence.

Supercomputers Still Super After All These Years, But For How Long?

Even Superman as he approaches his 50th birthday next year has been undergoing change at the hands of his writers (a little more vulnerability, both physical and emotional, and friendship rather than romantic entanglement with Lana Lang — he's now sort of a Yuppie from Space).

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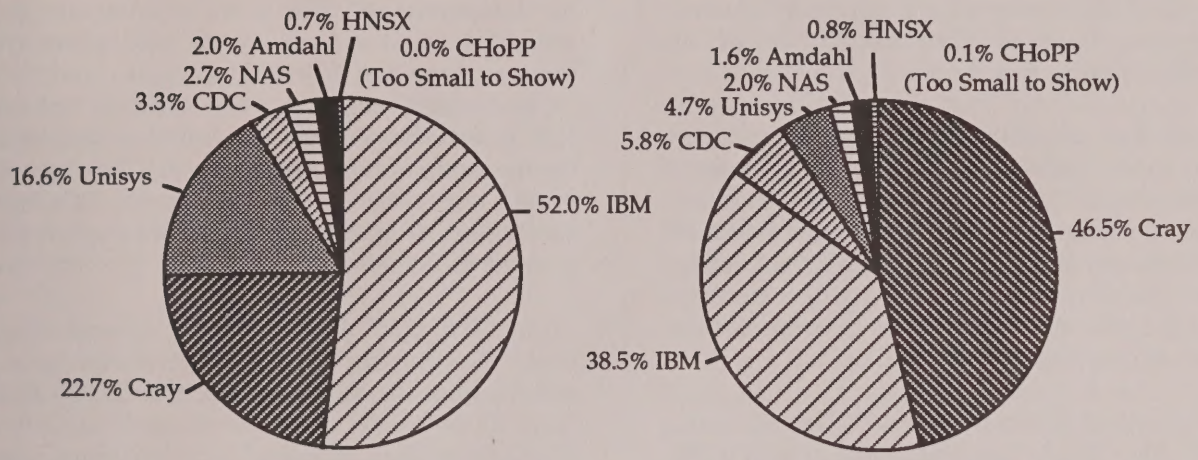
U.S.-Based Vendor Shares of the High-Performance Large-Scale Systems Market (Supercomputers Plus High-Performance Mainframes), 1986

(Source: International Data Corporation, 1987)



Units = 150 Systems

Revenues* = $1.3 Billion

*Includes gross hardware, software, and support income.

Supercomputers are changing, too, and not just because they have to keep getting faster:

- As the most mature element of the high-performance market, they have the largest chunk of the current value of the hardware shipments (just under half in 1986), and were, with workstations, the only strong performers in the technical computing field last year. In 1986 IDC estimates that Cray's 88% growth vaulted it to a tie with NAS for fourth place in the large-scale market behind IBM, Unisys, and Amdahl.

- But a maturing market cannot continue to grow at that pace. The supercomputer growth rate is projected to be the lowest of any high-performance sector through 1991. A CAGR of about 19% would bring the supercomputer share of high-performance shipment value in 1991 to under a third.

Amid the change in the supercomputer market, two issues stand out. First is Cray Research's ability to maintain its overwhelming command of the sector. The other is the question of the Japanese, both as market and competitor.

Cray and its Competitors. Just because Cray revenue has grown only 14% through the first three quarters of 1987 isn't itself a major cause for concern. The higher mix of new leases rather than outright sales is the principal reason for the revenue slowdown. Of larger significance to many observers has been the future potential of the company after it dropped the MP project as run by Steve Chen, and Chen's subsequent resignation.

The *Gray Sheet* doesn't believe that the effects of the September turmoil will be long-lasting. The principal role of the MP line has become its abilityto offer a family of models addressing different levels of need, including a $2.5 million entry point. This panoply of choices has been crucial, since the growth sector for supercomputers has lately been the less expensive, lower-performance models.

An XMP follow-on will in fact appear that should continue to give Cray a wide span of supercomputer performance. Because Chen's project would have competed with the Cray-3 and Cray-4, a case could be made that the company now has less risk of confusing future high-end users. *continued on page 6*

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The real lesson of the cancelled MP project is that supercomputers have become an integral part of the established computer industry, subject to the same budgetary and managerial constraints as other manufacturers. It is ironic that the contretemps occurred at a company founded by Seymour Cray, but his successor as CEO of Cray Research is an MBA.

The other side of the coin is the emergence of new competition in what had become as close to a monopoly as currently exists in the modern computer industry. CHoPP is the newest kid on the block, but the strongest marketing muscle, hence visibility, among Cray's U.S.-based rivals right now still belongs to the company that Seymour Cray left in 1972.

In October, Control Data's ETA subsidiary, which has hired Carl Ledbetter, late of IBM and (briefly) Prime, to pilot it from R&D to a business enterprise, had a flock of announcements. To add to the two ETA10-E systems installed, six other contracts have been signed, including two new ones. Of these, the most gratifying was the "Only American Companies Need Apply" supercomputer contract at the Tokyo Institute of Technology. It has finally shipped EOS, the proprietary operating system tuned for the ETA10 family, in place of VSOS, the Cyber 205 operating system, and announced availability dates for native Unix V on the ETA (beta test 1Q1988, ship 4Q1988).

Moreover, it was able to distribute Technical Memorandum No. 23, October 9, 1987, in which Jack Dongarra, guardian of the Linpack benchmark, for the first time officially blessed the ETA10-E uniprocessor as the megaflop leader. It preannounced for mid-1988 a connection between Cyber 180s running NOS/VE and ETA10s allowing users of CDC mainframes to initiate jobs on a Cyber and use the ETA10 as a compute server. And it put new price/performance pressure on its rivals with the new P ("Piper") and Q model families, reputedly the first air-cooled supercomputers (minisupers are also air-cooled, but at lower performance points), and the first to start under $1 million.

But problems persist. For one thing, ETA will have to fight its reputation of being a day late and several nanoseconds short. CDC officials concede that too much was discussed, and by implication promised, by ETA before it lost its independence. The milk is spilt, though, and ETA must deliver on its 1988 promises (above all the 7ns ETA10-G) to regain credibility and check negative marketing by others (Cray, for example, has attempted to discredit the megaflop numbers in Dongarra's October report; a November update nudged the ETA10-E down from 56 to 52 megaflops, although it remained in first place).

For another, ETA is much more dependent on outside technology than its supercomputer rivals have been. In particular, the chips come from Honeywell, which developed them for the Defense Department's VHSIC program. At the Piper announcement an exec stated that CDC has continued to discuss partnerships in ETA with other companies, no longer for cash, but for technology. If Honeywell was one of these companies, it is understandable why the discussions have proven abortive, since Honeywell is a partner in HNSX with NEC.

Finally, it is not clear that the Piper's impressive price/performance is a threat to the supercomputer market. The Gray Sheet suspects that the early ETA10-P customer interviewed at the announcement will not be unique: it put the Piper up against SCS and Convex minisupers, not Cray supercomputers.

That Leaves the Japanese — but so far out in the cold, at least as far as the U.S. market is concerned. Fujitsu has given international marketing rights to its supercomputer line to Amdahl, which did not sell a single system in the U.S. until this summer. HNSX, established to leverage Honeywell's name in the U.S. market after NEC succeeded in placing only one system in this country, has just seen a potential sale to MIT evaporate after Defense Department clucking about using Japanese technology.

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Meanwhile, after considerable pressure, U.S. supercomputer manufacturers are making inroads into the Japanese market. Cray lost the NIT bid to ETA, but even so IDC's Tokyo office reports that it could almost double its installed base in Japan this year (there were seven Crays there on January 1).

There are two lessons here. First, the U.S. government is sending mixed signals that could be viewed by the uncharitable as gross hypocrisy. Second, a supercomputer can mean different things in the U.S. and Japanese markets.

In the U.S., a supercomputer is still a very specialized tool. A forthcoming report from IDC's Technical Computing Program indicates that about a third of Cray shipments in 1986 went for defense applications, while almost another third went for scientific R&D, often academic. The next highest proportions of intended applications (over a quarter of shipments) supported biological, chemical, and geological engineering. The only real commercial application was financial modeling, which accounted for 6% of shipments.

In Japan, as the *Gray Sheet* has noted before (Vol. 21, No. 1, May 14, 1985), the emphasis is more on integrating supercomputers into national economic growth. Most Japanese supercomputer vendors, for example, design their supercomputers as interactive extensions of their mainframe lines. This different approach is at least as much the reason for slow acceptance of Cray-style supercomputers in Japan as the much ballyhooed "nontariff barriers."

High-Performance Mainframes: The IBM Alternative

One piece of corroborating evidence for this assertion is the success of IBM with its Vector Facility (VF) on 3090s in the Japanese private sector. According to an October IBM briefing attended by the Gray Sheet, IBM's integration of commercial S/370 architecture with vectorization has pulled even with Fujitsu's similar implementation in Japan, without the governmental nudges necessary for Cray and ETA sales. IDC's Japan branch reported back in May that there were already orders for over 50 VF units there.

At the October briefing Dr. Irving Wladawsky-Berger of IBM's technical computing group indicated that there were about 250 VFs installed worldwide on 140 3090 systems. Although at least half were net new 3090 business, he expressed a wish that he could translate some of the company's success in Japan into sales in the U.S. and elsewhere. What he and the rest of IBM have to do is to stimulate the same interest in integrated vector and scalar processing on the S/370 architecture that Japanese users demonstrate.

One missionary in this endeavor is Prof. Kenneth G. Wilson, the resident spirit of the Cornell National Supercomputer Facility, which uses a 3090-600E with six VFs. No one else anywhere makes this extensive use of VFs, but universities are the other market with which IBM is happiest, with between 30 and 35 VFed 3090s in worldwide academia. Meanwhile IBM can only smile when Wilson goes around saying that he sees too many supermini applications that should really be running on supercomputers, as long as he colors them blue.

The application foci for the VF are engineering, chemistry, financial services (mostly in Japan), and the oil industry. However, IBM does not intend to do software development for the VF, and hence must depend on ISVs to port applications over. For this reason the center of gravity for nonacademic U.S. sales has been in structural dynamics, where there already existed a large body of MVS software. Most other applications involve porting VM software.

The VF will remain the point man for IBM's push back into the scientific/ engineering battlefield. As the XA architecture moves down into 4381 and 9370 territory, they will also receive VFs, probably in the 1989-90 timeframe.

One competitor rooting for IBM to succeed is NAS, whose engineering/ scientific group under Tom Frana needs Big Blue validation for its own vector offerings. NAS, though, is also committing to Unix and styling itself an "Open Systems Supplier" for the technical market.

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• **THE OTHER SHOE AT HONEYWELL BULL.** Another round of layoffs (some 1,600 jobs over the next year) will accompany the consolidation of Honeywell Bull manufacturing at its Lawrence, MA, facility, and of Massachusetts support activities in Billerica, MA. Systems formerly manufactured in Phoenix, AZ, will now be produced in Massachusetts; the Phoenix site will henceforth focus exclusively on software development and marketing for HB mainframes.

So far Lawrence only picks up production for the DPS 8 family (now led by 8000s and 88s). As noted in earlier issues, there have been discussions between HB and NEC about transferring production of the DPS 90 for the U.S. market from Japan to the States. However, Jerry Meyer, CEO of Honeywell Bull, has intimated that the 90 is now too far along in its production cycle to be worth the expense and trouble of transferring manufacturing. The negotiations will therefore shift to the follow-on generation of mainframes.

• **BLUMENTHAL STRIKES AGAIN.** The latest installment in Mike Blumenthal's growth-through-acquisition strategy occurred on November 9, when Unisys acquired Timeplex in a stock swap worth in excess of $300 million. Timeplex, which was bringing in revenue at a $150+ million p.a. clip, has been expanding its integrated digital communications network base from T-1 networking switches (e.g., it recently acquired Cygnus, a packet-switching vendor). Apparently to signal that a true integration of Timeplex is contemplated, unlike the situation with Memorex, Timeplex will be renamed Unisys Networks.

IDC's communications analysts believe that considerable synergy is possible from the merger. Timeplex, which had been losing a lot of new business to aggressive competitors like Network Equipment Technologies, now has access to the deep pockets it needs to reassert itself technologically. Unisys in its turn gets extremely useful and timely networking assistance.

The question is for how long. As part of the merger agreement, Unisys has a right of first refusal of some 500,000 Timeplex shares held by Edward Botwinick, the chairman/CEO of Timeplex who becomes president of Unisys Networks and a senior vice president of the parent corporation. If Botwinick, who has been considered the linchpin of Timeplex's success, were to leave Unisys Networks any time soon to start a new business, it would adversely affect the future of an entity that depends on people rather than hardware.

• **DOUBLE HIGH ENDS FROM UNISYS.** In November Unisys introduced new high-end systems for its Burroughs and Sperry lines. The A17 will ship in single- and two-processor configurations in May, in three- and four-processor configurations in June. The 1100/90 Model II Turbo allegedly increases high-volume transaction performance around 25% by speeding up main storage.

• **NO DCA/UNGERMANN-BASS MERGER.** After the Ungermann-Bass board rejected DCA's unsolicited but ostensibly "friendly" acquisition bid, DCA bowed out rather than risk the unfriendly route. Ralph Ungermann's attitude wasn't just "no," but "hell, no," especially now, especially with DCA. He disclosed that DCA execs had several times over the past couple of years proposed joint business ventures with Ungermann-Bass. "On each occasion, we concluded and conveyed verbally to DCA that these arrangements in the long run would not contribute positive values to Ungermann-Bass and its shareholders."

• **TARGON — IT'S A GERMAN COMPUTER, NOT A JAPANESE MOVIE MONSTER.** Nixdorf has kicked off a commercial Unix push in the U.S. centered around its Targon family, including the Targon 35/50 RISC-based supermini, which is new to the U.S. market. The company will attempt to leverage the same solutions approach that has stood it in good stead in Europe.

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THE GRAY SHEET
Computer Industry REPORT

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Computer Industry Stocks Stuck in the Goblin Market

October is in the eye of the beholder. English poets typically treated it as the lazy end of summer warmth, while to Poe it was when the sky was "ashen and sober" and "the leaves they were withering and sere." In New England it is brushstrokes of vibrant color, in parts of the South the musky smell of decay, and in the Southwest the same as any other season. Only a few dyspeptic students of events almost six decades ago associated it with economic chaos.

Until now. A stock market that had been weakening for two weeks suddenly hemorrhaged on October 19. Computer industry stocks shared more or less equally with others in the gradual descent, and then the precipitous fall of 508 points on Mad Monday. They did not take a proportionate allotment of the partial recovery that followed.

The most recent bull market in computer stocks crested on October 5. The Dow Jones Industrial Average stood at 2640.18 at the close of trading, fractionally down from October 2, but high tech was still soaring. Digital was at $197.75 a share, IBM at $156.50, Cray at $97.75, Texas Instruments at $79.38, Microsoft at $79.00, NCR at $86.00, Intel at $62.75, Apple at $59.25, and so on. An index of 40 computer industry stocks created by the Gray Sheet (see the table inside) had climbed to 1911.56, up almost 119 points from the end of trading on September 30.

Then the erosion began. After October 5, when only five of the 40 computer stocks surveyed were down, and then only trivially, it would be twelve working days before the plus signs so momentously outweighed the minus signs at the end of trading. By the end of trading on Friday, October 16, the Dow Jones had slipped to 2246.74, down nearly 350 points from the start of trading on October 1. The Gray Sheet index had fallen to 1635.19, down almost 9% from the start of the month and down 14.5% from the October 5 peak.

Performance of the Forty Computer Industry Stocks Vis-a-Vis the Dow Jones Average of Thirty Industrials, October 1 - October 23, 1987

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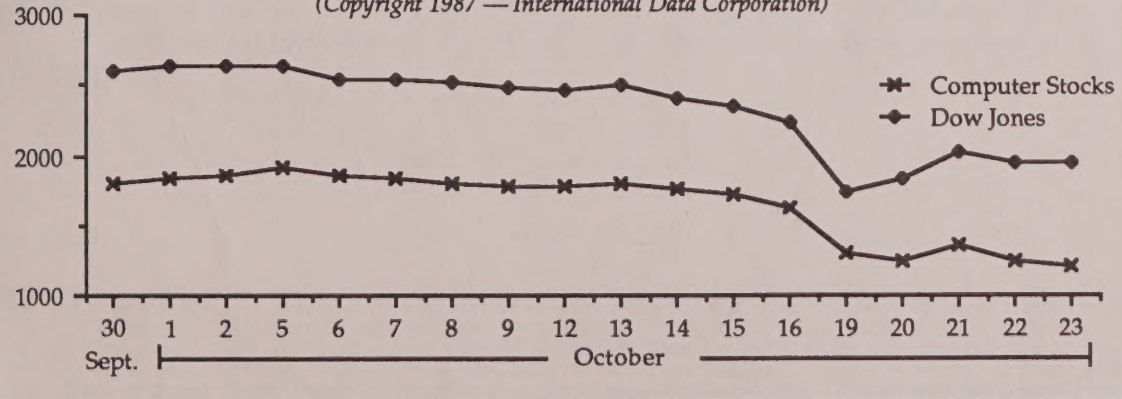

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Few were concerned at first. Since the late summer surge, there had been a couple of minor waves of profit-taking and renewed growth. But by the end of the second week, some Wall Streeters were starting to act antsy.

Then came the deluge. By the end of trading on October 19, stocks in the Dow Jones average had lost almost 23% of the value they represented on Friday afternoon. A year and a half of growth was wiped out, however temporarily.

The 40 stocks in the Gray Sheet index fell 20.5% that day. No one escaped. The smallest fall in the sample was 8.7% (Altos), the most severe 45.9% (Franklin Computer). Digital plummeted 24.5%, and IBM 23.5%. When Microsoft fell 29.8%, Bill Gates was suddenly no longer a billionaire.

As precipitous as the decline was, it looked even worse when compared to October 5 prices. When the 4:00 bell tolled on October 19, it tolled for Digital, which at $130.00 had fallen 34.3% in two weeks; for IBM, which at $103.25 had fallen 34.0%; for Cray, which at $69.00 had fallen 29.4%; for TI, which at $49.00 had fallen 38.3%; for Microsoft, which at $45.25 had fallen 42.7%; for NCR, which at $59.50 had fallen 30.8%; for Intel, which at $42.00 had fallen 33.1%; for Apple, which at $36.50 had fallen 38.4%. And for everyone else in the index, which at just under 1300 had fallen 32.0%.

The news didn't get a whole lot better. The Dow Jones climbed back over 100 points on Tuesday, but that was due almost entirely to bargain-hunting among the bluest of chips. Stocks like IBM and Digital were up in double-digit percentage points from their closing prices on Monday, but almost three-quarters of the stocks in the Gray Sheet index were down again. The index as a whole slipped 42.75 points, to 1256.63.

Wednesday was trumpeted as a day of widespread rebound from the Great Correction. The Dow Jones was up 186.84, or 10% to the good from the Tuesday closing, and 16.6% from the ghastly situation on Monday. But it wasn't widespread enough to rescue a number of high-tech stocks. Nearly half of the stocks in the Gray Sheet index were still below their final Monday prices. The overall index was up 8.2% for the day, and up only 4.6% from Monday.

On Thursday the 22nd the Dow Jones slipped back 77.42 points, but the Gray Sheet index fell 108.94. The market was still some 12% above its Monday closing, but the 40 stocks in the index were in aggregate *down* almost 4%.

On the fifth day most of the market rested. On a volume of trading that, after the rest of the week, seemed low-to-moderate, the Dow Jones didn't budge.

But the Gray Sheet index continued to move southward. At the end of trading, it stood at 1212.81, down 6.7% from Monday, down 36.6% from October 5.

By Friday it had become a case of God bless the child that's got its own. IBM stood at $120.75, up $17.50 (some 17%) from Monday. Only nine other stocks in the index were also up over Monday prices, including some pretty minuscule gains (Compaq was up only 25¢) or meaningless ones (Encore was up 25%, but that entailed only an additional 56¢). Even Digital was down $3.00 from Monday, for a drop of $70.75 from October 5.

Others did much worse. Mentor Graphics was down 34.4% from Monday, Ask Computer Systems down 27.5%, Control Data down 25.4%. Down in the vicinity of 20% from Monday prices were Amdahl, Apollo, Data General, Floating Point, Informix, Intel, Micropolis, Prime, Silicon Graphics, and Sun.

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Mad Monday: Forty Computer Industry Stocks at the Close of Trading, October 19, 1987

Company	Exchange	Final Price	Daily Change	Daily Chng. %	9/30 Change	9/30 Chng.%	10/5 Change	10/5 Chng.
Compaq	NYSE	49.25	-13.00	-20.9%	-23.25	-31.1%	-29.00	-37.15
CDC	NYSE	31.00	-6.13	-16.5%	-4.25	-12.1%	-6.38	-17.1%
Cray	NYSE	69.00	-16.00	-18.8%	-23.88	-25.7%	-28.75	-29.4%
Cullinet	NYSE	7.00	-3.25	-31.7%	-5.50	-44.0%	-6.88	-49.5%
Data General	NYSE	26.00	-5.00	-16.1%	-6.88	-20.9%	-8.38	-24.4%
Digital	NYSE	130.00	-42.25	-24.5%	-59.75	-31.5%	-67.75	-34.3%
Float. Pt.	NYSE	5.75	-2.00	-25.8%	-3.00	-34.3%	-3.63	-38.7%
Harris	NYSE	27.75	-7.38	-21.0%	-10.25	-27.0%	-11.75	-29.7%
Hewlett Pckrd.	NYSE	47.63	-12.13	-20.3%	-22.88	-32.4%	-25.88	-35.2%
Hitachi	NYSE	84.50	-15.63	-15.6%	-20.50	-19.5%	-18.88	-18.3%
IBM	NYSE	103.25	-31.75	-23.5%	-47.50	-31.5%	-53.25	-34.0%
NCR	NYSE	59.50	-10.38	-14.8%	-22.88	-27.8%	-26.50	-30.8%
Prime	NYSE	17.88	-2.25	-11.2%	-7.50	-29.6%	-8.13	-31.3%
Tandem	NYSE	23.25	-6.50	-21.8%	-10.00	-30.1%	-13.13	-36.1%
Tandy	NYSE	35.50	-10.00	-22.0%	-16.75	-32.1%	-21.00	-37.2%
Texas Instr.	NYSE	49.00	-18.25	-27.1%	-25.75	-34.4%	-30.38	-38.3%
Unisys	NYSE	30.50	-7.50	-19.7%	-14.13	-31.7%	-16.63	-35.3%
Xerox	NYSE	56.25	-13.88	-19.8%	-22.75	-28.8%	-22.13	-28.2%
Amdahl	AmSE	35.50	-8.00	-18.4%	-11.63	-24.7%	-14.00	-28.3%
Atari	AmSE	8.00	-2.00	-20.0%	-3.13	-28.1%	-4.63	-36.6%
Wang C	AmSE	11.75	-5.13	-30.4%	-6.00	-33.8%	-7.00	-37.3%
Altos	NASDAQ	11.88	-1.13	-8.7%	-2.13	-15.2%	-2.88	-19.5%
Apollo	NASDAQ	14.00	-3.00	-17.6%	-6.50	-31.7%	-8.50	-37.8%
Apple	NASDAQ	36.50	-11.75	-24.4%	-20.00	-35.4%	-22.75	-38.4%
Ashton Tate	NASDAQ	20.50	-5.50	-21.2%	-7.00	-25.5%	-12.25	-37.4%
Ask Computer	NASDAQ	10.00	-1.88	-15.8%	-3.50	-25.9%	-3.75	-27.3%
Encore	NASDAQ	2.25	-0.94	-29.4%	-1.56	-41.0%	-1.56	-41.0%
Franklin Cmtr	NASDAQ	5.75	-4.88	-45.9%	-5.63	-49.5%	-5.75	-50.0%
Informix	NASDAQ	21.75	-4.50	-17.1%	-5.00	-18.7%	-8.50	-28.1%
Intel	NASDAQ	42.00	-10.00	-19.2%	-15.75	-27.3%	-20.75	-33.1%
Intergraph	NASDAQ	23.00	-3.50	-13.2%	-4.00	-14.8%	-5.25	-18.6%
Interleaf	NASDAQ	14.88	-3.38	-18.5%	-4.38	-22.7%	-8.38	-36.0%
Lee Data	NASDAQ	3.75	-0.50	-11.8%	-1.50	-28.6%	-1.13	-23.1%
Lotus	NASDAQ	26.25	-6.00	-18.6%	-7.00	-21.1%	-12.00	-31.4%
Maxtor	NASDAQ	9.50	-2.25	-19.1%	-4.13	-30.3%	-5.75	-37.7%
Mentor Gr.	NASDAQ	26.88	-6.00	-18.3%	-7.38	-21.5%	-11.50	-30.0%
Micropolis	NASDAQ	24.25	-5.50	-18.5%	-4.13	-14.5%	-9.50	-28.1%
Microsoft	NASDAQ	45.25	-19.25	-29.8%	-21.00	-31.7%	-33.75	-42.7%
Silicon Gr.	NASDAQ	16.75	-3.00	-15.2%	-4.38	-20.7%	-8.00	-32.3%
Sun Micro.	NASDAQ	36.00	-4.50	-11.1%	-0.25	-0.7%	-6.25	-14.8%
TOTAL		**1299.38**	**-335.81**	**-20.5%**	**-493.31**	**-27.5%**	**-612.19**	**-32.0%**
Dow Jones		1738.74	-508.00	-22.6%	-857.54	-33.0%	-901.44	-34.1%

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After this additional slippage, eight of the stocks in the Gray Sheet index were worth only about half what they had gone for on October 5: Apollo, Ask, Cullinet, Floating Point, Intel, Maxtor, Texas Instruments, and Mentor. Other stocks that had lost more than the 36.6% index average were Compaq, CDC, Cray, Data General, Hewlett-Packard, Prime, Amdahl, Atari, Apple, Ashton Tate, Informix, Interleaf, Micropolis, Microsoft, and Silicon Graphics. The only reason why the index average wasn't worse was that IBM had the best record of any of the 40 stocks, at 22.8% down from October 5.

So what happened? Henry Kaufman wrote a piece for the October 25 Sunday *New York Times* in which he blamed the crash on the failure of American business schools to teach financial history. The Gray Sheet yields to no one in its respect for history, but the main reason that economists can't agree on what will happen in the future is that they can't agree on what happened in the past. Twenty years from now there will be at least twenty different explanations for what transpired on October 19, 1987.

At the very least they can agree with the broad (if somewhat circular) generalization offered by Nicholas Brady, chosen by President Reagan to head a task force investigating the crash: "The principal reason for the drop was that common stocks all over the world are overvalued." In other words, stocks have been bid up with a heavy saturation of what used to be called "water" — bets on future growth. At some point, if investors lose faith that the water will be sopped up by real income gains, it has to be wrung out.

For many or most, or anyhow some, of those twenty explanations, investors decided that point had to come. We've been put through the wringer.

As to why stocks in the Gray Sheet index did worse than the Dow Jones, there are probably two reasons. One is that smaller companies in general did worse than blue chips after October 19. A list combining 40 large and small companies in almost any industry would show a not dissimilar profile.

Not dissimilar, but not really similar either, given the weak October 19-23 performance by Digital and most other industry leaders, except for IBM. Different types of stocks have had different water levels. High-tech stocks were recently leading market growth because of extreme investor expectations of high returns — water, in short. They are leading the retreat, too, because when the balloon burst, there was more water to pour out.

In this regard, the industry stocks with the worst performance records since October 5 can be divided into three categories. One would be companies with demonstrated short-term weaknesses that the market understandably decided to stop propping up (Apollo, Cullinet, DG, FPS, et al.). A second would be manufacturers of semiconductors and components like TI and Intel, historically the industry weather vanes for good news and bad alike. And the third would be some of the companies whose superlative results so far in 1987 had fed earlier speculation in their stocks. Witness Amdahl, Apple, and Sun.

The third category speaks to one of the central paradoxes of the crash — that it occurred in the context of economic news that was usually no worse, and sometimes better, than in recent years. The market freefall took place even as the wire services were buzzing with third quarter financial results that, in the computer industry at least, looked pretty damn good.

The results to date for the 80 publicly held industry companies that the Gray Sheet has been tracking in 1987 verify this. For the companies that have so far made it onto the new spreadsheet, revenue for 3Q1987 was up 12% over 3Q1986, and income was up 54%. These numbers will swivel around some as the rest of the companies are added, but it is worth noting that for the **same** companies (not the whole sample) in the **second** quarter, revenue would have been up 9.5% and income 20%; these figures are not that different from the final totals published in the Gray Sheet (Vol. 23, No. 8, August 30, 1987).

In short, the rebound is on target. The problem is that investors had long ago factored the

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rebound into their calculations, and then some. More broadly, all the possible good news in the economy was already overrepresented in stock prices. Even without really bad news, it was time to start worrying.

What will the crash mean for the computer industry? Obviously, if a recession follows, it will suffer along with everyone else. It has matured to the extent that it has lost much of its past immunity to macroeconomic trends.

Even without a full recession, though, there would be consequences. One probable effect can already be glimpsed in the performance of industry stocks after October 19: a sharper dichotomy between the haves and the have-nots. The market will take the opportunity to re-evaluate companies against more realistic standards, and some will certainly suffer in the comparison.

Another corollary could well be longer delays before companies go public, which would probably lead to start-up money getting tighter.

The computer industry has, along with the rest of the world, received a massive jolt. The future has become murkier, except for something the Gray Sheet has been emphasizing from the start: that there is no panacea for the confluence of forces that created the Great Softness.

Who's the Boss? Computer Industry CEO's

With exquisitely bad timing, *Business Week* devoted a special issue, datelined October 23, to "The Corporate Elite" — the CEOs of the *Business Week* Top 1000. In its second year, this ranking is based not on sales or profits but on what the magazine calls "the single most useful way to gauge the dynamism of the U.S. economy": a company's market value. Oops.

Maybe the ranking will be useful next year as a gauge of how ruthlessly the financial community separates the sheep from the goats. As it stands, the listing often says more about investors' pipe dreams than about economic realities (witness the infusion of biotech start-ups).

It must be said, though, that CEOs are not noticeably more hard-boiled. In a *Business Week* poll conducted in mid-September by the Harris organization, 56% of CEOs vouchsafed that their company's stock was undervalued, while only 2% had the vision (or guts) to call it overvalued.

Still, the survey of the Thaumaturgic Thousand provides grist for the statistical mill. The Gray Sheet tweezed some sixty computer-related companies from the list to compare the average CEO of a major computer industry vendor with his (alas, the male possessive pronoun is apposite) peers elsewhere.

The recurring theme is the relative youth of the computer industry:

- As might be anticipated, the composite computer industry CEO is, at 52, on average five years younger than his peers elsewhere. Amazingly, though, Bill Gates was **not** the youngest CEO in the Top 1000.

- Average compensation from salary and bonuses was also lower — at $535K, some $120K below the average elsewhere, and still $70K under if the $10,000,000+ incomes at Chrysler and Reebok are removed.

- Computer CEOs are slightly more likely to have graduate degrees (48% vs. 42%), and no less likely to have MBAs (just under 20% in both cases — and don't forget that Mike Blumenthal's Ph.D. was in economics).

- Arguably strong evidence that the computer industry is still relatively young and vibrant is that, while 12% of the other Top 1000 companies had a lawyer at the helm, **none** of the computer companies did.

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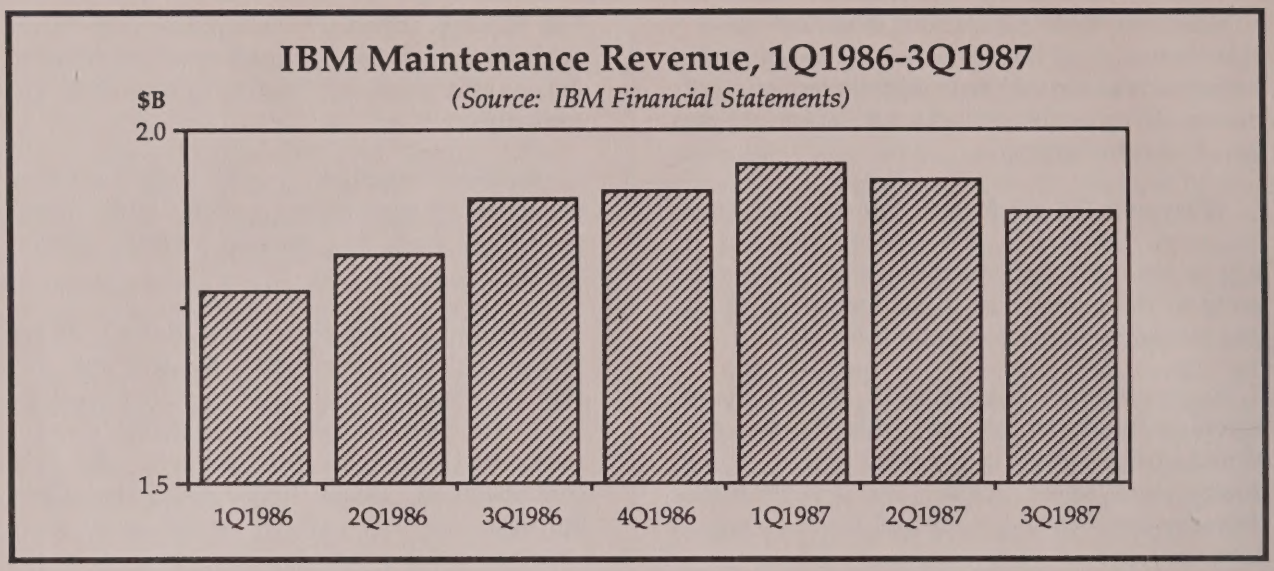

Maintaining a Low Profile: IBM's Third Quarter

As has been the case throughout 1987, the Gray Sheet compendium of 3Q financial results would look even stronger without IBM. Sans Big Blue, the aggregate of results received to date would have been up some 17% rather than 12%, and net income would have been up 185%, not 54%. These figures are more susceptible to mood swings than when IBM is included, but you get the picture.

IBM's first up quarter in net income since June 30, 1986 (12.2% up, to be exact) should have been cause for celebration, but the context was not entirely roseate. Third-quarter revenue growth of 6.9% is better than the 5.5% growth registered in the first quarter, certainly than the 4.3% growth tallied in the second. But it's not the rush that a lot of people were expecting from new IBM products, especially the 9370s.

Just to play devil's advocate, though, there were two hidden aspects to the third quarter report that speak well, if not loudly, about IBM prospects. One is that the growth in revenue and income was achieved without as huge a boost from currency translation as in the first two quarters. Without the currency bonus, IBM would have grown only 2.7% in revenue and 4.3% in income for the quarter — but without the currency windfall over the first half of 1987, revenue would have been down 1.9%, and income down 24.5%.

The other hidden aspect — or at least an aspect that hasn't received due attention — is that the overall growth was achieved despite declining maintenance revenue. After peaking in the first quarter, it started to slide until, at $1.885 billion, 3Q1987 maintenance was actually down .8% from 3Q1986.

This decline in effect represents dividends paid by IBM on an insurance policy to protect future margins. The new Corporate Service Amendment initiated early this year was designed to lure large users to assume more of the regular maintenance burden. The lure, of course, was a significantly reduced bill. As more and more customers signed up, 1987 maintenance revenue began to shrink, but IBM obviously believes that lower expenses in the future will more than make up for revenue hits taken during what would be a weak year anyhow.

That's what the devil's advocate would say. The fact remains, though, that unless IBM midrange sales pick up, there will still be hell to pay.

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Sun Tries to SPARC Another Revolution

With its RISC-based SPARC chip, Sun Microsystems is trying something radically new, but it's seeking market acceptance in the same way that it has achieved success in the past — by proclaiming itself the trailblazer for industry standards. The catch this time is that the standard is not nonproprietary Unix or vendor-transparent networking, but Sun's proprietary chip architecture.

Today the only implementation of SPARC is the homegrown Sun-4 workstation, which uses chips produced by Fujitsu in conformance to Sun's design. However, Sun is vigorously seeking OEMs, and is finding them in important places.

The most significant to date is AT&T, if only for its endorsement of a technology created somewhere other than Bell Labs. In an announcement at AT&T corporate headquarters on October 19, Vittorio Cassoni embraced the SPARC chip as "the wave of the future" and promised a nonworkstation platform based on it.

Just as importantly, AT&T vowed to work with Sun to create a standard Unix for the SPARC. This would be an extension of the existing agreement to merge pre-SPARC Sun OS with Unix V, a project that is now essentially complete.

The focal point for the new Sun/AT&T project will be an Applications Binary Interface (ABI) for Unix on the SPARC architecture. By defining interfaces, file locations, networking, windowing, graphics, and "look-and-feel," a consistent ABI would allow the automatic portability that Unix usually fails to deliver on other chips, as well as (at least potentially) a degree of user friendliness that has eluded Unix in the past.

Although Sun stands to gain the most from the joint project, it will be AT&T that will invest the manhours (some 100 engineers!). The likely reason is that, with the advent of Posix and increased pressure from X/Open and others, AT&T has seen control of Unix starting to slip from its fingers. The ABI agreement is a chance for AT&T to reclaim a leadership role in defining what could become a major Unix implementation. AT&T will be the official source for licensing Unix with ABI for the SPARC.

ABI would mean little if others didn't hop on the SPARC bandwagon. At the AT&T announcement, Areté climbed up. And on October 26, Xerox jumped aboard. Though Xerox's initial emphasis will be on document processing (i.e., ViewPoint applications and the XNS networking environment), the handwriting already seems on the wall for other applications as well (e.g., AI workstations).

Xerox expects that the transition to SPARC technology will take 2-3 years, as the company migrates software and waits for the SPARC price curve to start sloping downward. Fujitsu has announced that it expects to produce 5,000 10-MIPS units/month by the end of December, and 15,000/month a year later.

Sun's interest in the widest possible dissemination of SPARC technology can be seen more clearly when contrasted with the marketing strategy of a competitor like Edge, which is trying to OEM its high-performance, CISC-based, Motorola 68000-compatible systems to international vendors. It hopes to leverage what is normally a Sun advantage: adherence to industry standards at a time when there is no standard for RISC architecture.

But vendors are betting on RISC, especially for high-end workstations (not only Sun, but HP, SGI, IBM, and probably Apollo). For the near future Sun promises 20-MIPS SPARC chips (to be manufactured by Cypress) and 40-MIPS versions (out of Bipolar Integrated Technology). Olivetti, Edge's primary OEM partner, is so bullish on RISC that last year it hired as its vp of research the developer of the Acorn Risc Machine. If Sun does manage to create a de facto RISC standard, it will have staged yet another coup.

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• **OH thirtysomething.** Motorola was obviously smarting over the attention that Intel's 386 chip has been getting. It's bad enough that IBM-compatibility almost automatically guarantees a volume production that Motorola can only envy (it has shipped 1,000,000 68020s to date, while Intel's CEO has been quoted as saying he won't be happy unless he ships 2,000,000 386s in 1988 alone). With Unix on the 386, Intel can begin to attract established systems vendors (witness Prime) and new start-ups.

In response, Motorola staged the official unveiling of the 68030 at Tavern-on-the-Green in Central Park and billed the product as "Oh thirty!," written in script that reminded viewers who had walked up Broadway of the "Oh Calcutta!" signs. It largely eschewed techie talk, so one had to peruse the fine print to pinpoint the improvements over the 68020 (e.g., 256-byte instruction and data caches that can be accessed simultaneously, a pipelined "Harvard" architecture, "Burst Fill" capability to goose information speed between the 030 and external memory devices, and an onchip memory management unit).

In conjunction with the 20MHz 030, Motorola announced that a 25MHz version would be available for sampling in December; that a second-generation floating point math coprocessor, the 68882, would accompany the 030; that the 68040 project is official, even though no specifications or production schedules are yet available; and that an emulator module on the 030 will allow more effective emulation of software written for other microprocessors (read: Intel).

Also, Motorola and UniSoft are jointly proposing a portability standard for Unix applications. When asked about AT&T's current efforts to regain control of the Unix standard, including pressure to restrict UniSoft's ability to license Unix, a Motorola spokesperson managed to express his frustration with AT&T while remaining officially diplomatic.

The centerpiece of the Motorola show was the table of major 68000 customers — Apple (John Sculley himself), NCR, Unisys, Northern Telecom, and Sun. Upward compatibility within the 68000 family remains Motorola's major competitive advantage. Thus, despite SPARC, Sun will add an 030 line of workstations once it figures out a name for a successor to Sun-3 (Sun-5 would imply an advantage over Sun-4, the company's proprietary RISC architecture).

• **MORE MIDRANGE MANEUVERS BY IBM.** On one side of IBM's midrange divide, it has announced a very competitively priced entry-level S/36 that does not require a PC front end. On the other side, it added further enhancements to the VM operating system to facilitate IBM-style distributed processing. Besides allowing the distribution of programming changes from a central site to outlying 9370s and file-sharing across multiple VM systems, the additions include CICS/VM for a limited amount of transaction processing. IBM also added new capabilities to NetView that extend the merged system/network management concept scheduled for Release 2 in 1Q1988.

• **UNGERMANN-BASS TAKEOVER ATTEMPT.** Digital Communications Associates, Inc., is putting the moves on Ungermann-Bass. Arguing that "the proposal has been timed to take advantage of the unprecedented decline in the securities market," Ralph Ungermann has responded that "this is obviously not the time for our company to enter into an acquisition transaction."

• **COMPUTER MEMORIES MERGER A BOX-OFFICE FLOP.** Alas, the looniest computer industry merger in memory is apparently not to be, at least as originally announced. Computer Memories has cancelled the agreement by which it would "buy" — i.e., invest its remaining assets in — Hemdale Film. CMI cited litigation over home video rights to "Platoon" and "Hoosiers."

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The IBM-Fujitsu Arbitration Decision: A Loss For IBM, But Little Gain for Fujitsu

Successful arbitration is when you square the circle by pretending that everyone has won when in fact, to varying degrees, everyone has lost. The arbitrators in the IBM-Fujitsu software case — the only ones allowed to comment at length — are doing their best to turn their decision at least retroactively into a successful arbitration.

But there were losers. It's likely to be a cold day in the Persian Gulf before IBM again risks putting a critical issue up for arbitration. And while Fujitsu came out ahead, that's only because it started out so far behind. Fujitsu won only insofar as it didn't lose as much as it once expected to, not because it gained a true competitive edge against IBM.

The issue between the two companies arose because of the convergence of two phenomena by the early 1980s: the centrality of operating system software to IBM compatibility and profitability, and the development of software copyright law to embrace operating systems. The first phenomenon defined IBM's stake in the issue; the second seemed to give it considerable leverage.

Ever since the S/360 revolution of the mid-1960s, IBM has based its mainframe computer strategy on swapping up users' boxes that could run the same applications on the same operating system within a wide performance band. Sometimes the spur to buy new hardware was linked to the release of new operating system software, most recently when MVS/XA was timed to coincide roughly with the 308X large-scale generation (conversely, the absence of a new operating system extension with significantly higher functionality in conjunction with the Sierra generation has probably impeded 3090 sales).

The U.S.-based PCMs have fallen in step with this strategy by offering a range of compatible boxes capable of running IBM operating systems; Fujitsu and Hitachi, however, upped the ante by developing nearly compatible operating systems as well. Thus five years after deciding to enter the IBM-compatible hardware market with its M Series, Fujitsu shipped OSIV/F4 E10, its first IBM-compatible operating system, in 1975. There were apparently two marketing considerations impelling the Japanese manufacturers to invest so heavily in mimicking IBM operating systems: the needs of the Japanese market (e.g., the language issue), and the desire to assert a measure of independence from IBM.

In many respects they have succeeded admirably. In both the U.S. and Japan, IBM-compatibility accounts for about 80% of large-scale market value. However, while in the U.S. IBM has the lion's share of the market (indeed, over 90% of the value of IBM-compatible large-scale shipments even in 1986), in Japan it has under 40% of the IBM-compatible market if one adds in Fujitsu and Hitachi mainframe revenue. This discrepancy is all the more striking in that the U.S. PCMs use Hitachi systems and Fujitsu components.

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Yet the success has had its costs, for the two Japanese manufacturers have been forced into a two-front war: they have not only had to match and hopefully surpass IBM's hardware evolutions, but they've had to keep roughly in step with software developments as well. IBM's looming "extended architecture" and MVS/XA were the trigger for the embarrassing "Computergate" scandal in 1982, when Hitachi was caught with its fingers in IBM's microcode till.

IBM's vigorous reaction was an opportunity to send a strong message to Fujitsu as well about its attitude towards code poaching (indeed, there were some signals that Fujitsu was the real target of many of IBM's barbs, since it was then both bigger and more committed to international PCM competition than Hitachi). IBM could also use the scandal as leverage in its argument with independent software vendors who wanted access to source code.

The case against Hitachi was simple: company employees were caught with IBM internal documents, and that's theft. But an issue raised by the case with ramifications for other vendors involved the nature and extent of IBM's intellectual property. IBM's position was strengthened by recent developments in software copyright law.

When Fujitsu and Hitachi first developed compatible operating systems, IBM did not claim copyright infringement, and in fact didn't bother to attach a copyright notice to systems software sent to its own customers. At that time there was little reason to believe that operating systems were copyrightable. In fact, there was even debate about whether software in general was covered.

The rule of thumb in U.S. copyright law is that, while any original work "in any tangible medium of expression" is potentially protected, it is only the *expression* itself that is protected, not "any idea, procedure, process, system, method of operation, concept, principle or discovery, regardless of the form in which it is described, explained, illustrated, or embodied in such work." That's what the law says. But what is "tangible" in a computer program, and when does software as idea and (particularly for operating systems) procedure and method of operation become expression, if it ever does?

The law began to adjust to the computer revolution in the late 1970s. The legislative history of the Copyright Act of 1976 indicated Congress's intent to extend copyright protection to a programmer's "expression," although the exclusion of "actual processes or methods embodied in the program" managed to leave everyone confused. In 1978 the National Commission on New Technological Uses of Copyrighted Works, which had been created by Congress in 1974, recommended that the 1976 act be revised to extend protection to computer programs more explicitly. This was incorporated in the Copyright Act of 1980.

But the fight was just beginning, except that it was shifting from Congress to the courts. It was there, for example, that the extent to which systems software could ever truly be called an "expression" would be resolved. At this point the key decision is a 1983 federal appellate decision from the Third Circuit in *Apple Computer, Inc. v. Franklin Computer Corp.*, in which the court denied Franklin's contention that an operating system is by definition a "system" or "method of operation," and that in its code "expression" was identical to, and therefore no more protected than, its "idea."

While no laws have been written in stone since the Ten Commandments, the trend in software copyright law seems to be toward expanding the "expression" umbrella to include virtually all aspects of a program. Thus in 1986 the Third Circuit held in *Whelan Associates v. Jaslow Dental Laboratory, Inc.*, that "expression" in a program extended to the structure, sequence,

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Fujitsu, Hitachi, and IBM Japan Shares of Unit Shipments And Vendor Revenue in the Large-Scale Systems Market in Japan, Fiscal 1986*

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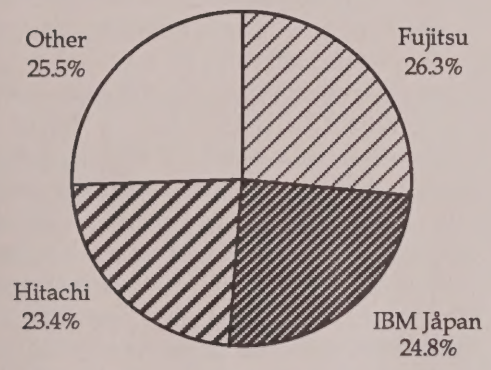
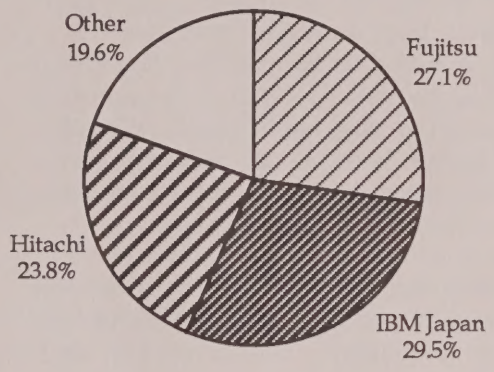
Units



902 Systems

Vendor Revenue



1.04 Trillion Yen ($7.08 Billion)*

*Fiscal 1986 ended on March 31, 1987 for Fujitsu, Hitachi, and most Japanese manufacturers, but on December 31, 1986 for IBM Japan. The dollar equivalent for yen represents the exchange rate on March 31, and does not correspond to what would have been earned in dollars over the course of the fiscal year.

and organization of code. The apotheosis (the *reductio ad absurdum*, some would say) of copyrightable code organization is undoubtedly the "look-and-feel" doctrine now associated with Lotus's lawsuits against clones that copied keystroke combinations like the backslash command.

IBM meanwhile had been keeping up with developments in the law. In 1978, it began to register copyrights for new releases of system software, and to label tapes sent to customers as copyright-protected. And in 1983, it negotiated settlements with Fujitsu and Hitachi highly favorable to its position, now strengthened by the thrust of U.S. copyright law.

The 1983 agreements are understood to have been in two parts:

- The payment of lump sum settlements by Hitachi and Fujitsu, and continuing fees on their installed base of operating systems equivalent to the cost of corresponding IBM programs until such time as they would be completely replaced by independently developed system software that did not infringe on IBM's copyright.

- The exchange of "external information" between IBM and the Japanese companies on which fees would also be charged. "External information" would include the code written into operating systems to facilitate connection to IBM-compatible peripherals.

Some aspects of the agreement were at least partially implemented. For example, both

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Fujitsu and Hitachi are believed to have paid significant amounts in 1983-84 for past copyright usage (IDC's Tokyo branch reports that Fujitsu, for example, may have paid between 30 and 40 billion yen — $210-280 million at today's exchange rate — in mid-1984).

Also, both Fujitsu and Hitachi began to develop new operating system releases that would not be dependent on IBM's copyrighted code. Most of the rewriting is believed to have been completed by 1985 or so, but there were still large gaps (particularly for submainframe systems), and the grunt work of going to customers and helping them rewrite all their applications in the clean operating systems was hardly begun for Fujitsu's large customer base.

More seriously, almost from the start there were acrimonious arguments about the 1983 agreements. As noted in the official opinion of the arbitrators:

- Fujitsu promised to respect IBM intellectual property rights, but their extent under applicable current law was not specified. Fujitsu took the opportunity to argue that its use of IBM material was now all kosher because it dated back to before IBM specifically copyrighted programs, or because it met the definition of permitted "high-level architectural design" research, or because it was not protected "expression."

- In regard to the last point, Fujitsu argued that much of the code in IBM's operating systems had become an industry "standard," and hence a regular procedure rather than an expression. IBM, Fujitsu claimed, was trying to use a dubiously expansive definition of copyright to lock users into a monopolistic operating environment.

- In some areas of contention, Fujitsu could question whether U.S. or Japanese copyright law should take precedence.

- IBM argued that Fujitsu's internal safeguards on using IBM information were inadequate to prevent inappropriate and illegal applications, for example by Fujitsu's hardware designers. In any case, IBM held that its efforts to review Fujitsu compliance were being thwarted.

- Neither party was willing to accept the other's definition of the "external information" to be covered. While IBM pressed for license fees, Fujitsu claimed that most of the interfaces it needed were public property because the requisite technical information had been published by IBM in user manuals. As a result, not one yen ever was paid to IBM on this section of the agreement with Fujitsu.

In other words, the 1983 settlement had settled nothing. In June 1985, IBM invoked the provisions for settling disputes under the 1983 agreement by compiling a list of charges against Fujitsu that would have to be arbitrated. In July, the charges were filed with the American Arbitration Association (AAA). In August, Fujitsu looked for a friendlier "court" by counterfiling with the Japan Commercial Arbitration Association, but in November officially responded to the AAA case. In February 1986, the two arbitration processes were combined under the AAA.

The combination was facilitated by the AAA panel, which originally consisted of IBM's choice, John L. Jones, a long-time MIS executive for the railroad industry who had helped develop Cobol; Fujitsu's choice, Robert H. Mnookin, a Stanford Law professor whose specialty has been children's rights and dispute resolution within families (who says the Japanese don't have a sense of humor?); and a tiebreaker appointed by the two arbitrators, Donald S. Macdonald. However, from the start the panel determined that all three members would function as neutrals. Macdonald resigned in May.

While negotiations were underway behind closed doors at the AAA, IBM was keeping pressure on Fujitsu. One tactic was the visits to customers of Siemens, which used Fujitsu mainframes both for IBM-compatible systems (some with the disputed OSIV operating system) and for its proprietary operating system; the

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intrusion of IBM investigators calculating potential license fees was surely one factor in Siemens' decision to transfer its PCM business to Comparex, a joint venture with BASF that uses Hitachi boxes.

Another tactic was to settle outstanding issues with Hitachi that closely paralleled the IBM-Fujitsu crosscomplaints. The details of last autumn's agreement are secret, but IDC's Tokyo branch understands that:

- IBM conceded that the latest Hitachi mainframe operating system was independently developed and hence does not infringe on the MVS/XA copyright, and that the operating system for small-to-medium-scale M-Series computers was exempt because it was not IBM-compatible.

- Future software releases will be subject to inspection by IBM to check for copyright infringement.

- Dropping its contention about user manuals, Hitachi acceded to IBM's position on "external information." In June 1986 it allegedly paid 40 billion yen (some $240 million) for prior use of interface information, and will continue to remit license fees to IBM on all installed software including interfaces to IBM-compatible peripherals. The license charges are estimated to be a double-digit percentage of the monthly rental fee.

A year ago the feeling was that Hitachi had gotten a good deal. Today it must be kicking itself.

Late this summer signs began to accumulate that the arbitrators' decision was imminent. The most significant signal was a flurry of excited activity on the part of Fujitsu, which deputized a U.S. public relations firm to sound out U.S. industry analysts (including the Gray Sheet) about Fujitsu's future in the PCM business if it were given IBM information available to no other vendor.

On September 15, the two remaining arbitrators broke their silence. IBM stands to make some money, but Fujitsu gets more than Big Blue bargained for:

- Fujitsu can clear the books with one lump sum payment, in an amount to be determined, as a paid-up license for compatible software. Considering precedent and signals to date, the Gray Sheet expects the charge to be in the vicinity of $400-500 million.

- The "external information" issue will be resolved by allowing either party (meaning Fujitsu) to establish a "secured facility" where it can, for a fee and over a "contract period" of five to ten years, inspect the other's source code to acquire the requisite data.

- The arbitrators will continue to have the authority to set fees, run the secured facilities, and resolve all conflicts between the parties.

The third point is crucial. In fact, the broad outlines of the decisions had been settled for a number of months. Thus Fujitsu agreed last December to pay a certain amount to IBM for most of the disputed programs. Presumably this will be the basis for the lump sum payment after final details are ironed out (some systems software is supposed to be added to the December list).

On February 23, the so-called "Washington Agreement" was signed. This provided for the "Secured Facility regime" to oversee use of the other manufacturer's programming material in independent software development, and authorized Jones and Mnookin to resolve conflicts in implementation. To quote them: "In effect, during the Contract Period, the Washington Agreement enpowers the Arbitrators to create a coerced license, to determine the information covered by such a license and to specify the price and enforcement terms."

Surprise, surprise. IBM and Fujitsu could not agree on the fees or controls that would be necessary to set up a Secured Facility by the April 1 deadline. The two mediators heard oral arguments from both parties in May; the September

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announcement is in essence a long detailing of how the arbitrators intend to make the Secured Facility agreement work.

Because the stakes are so high, the September announcement includes a number of specific safeguards. For example, one requirement is a "secure room" that will include the only voice, document, or data communication equipment permitted on the facility premises.

But the most important part of the order is the evidence that the arbitrators intend to make the Secured Facility agreement work by supervising it themselves. They will determine whether the location is sufficiently segregated from a vendor's hardware and other software development operations. They will appoint the facility supervisor if the parties can't agree on someone.

More importantly still, they will decide the nature and extent of information that can be copied on "survey sheets" and then used in software development if IBM and Fujitsu can't decide. They will have the right of review of the facility supervisor's decisions as to whether information on the "survey sheets" falls within permissible guidelines. And if IBM and Fujitsu can't agree on a system of payment for access to the other's source code by October 15, the arbitrators can impose a reimbursement scheme it considers fair.

The "Family Court" nature of the decision suggests that Fujitsu's best move may have been selecting a family law expert as its arbitrator. From the start, the arbitrators indicated their unwillingness to participate in "an extensive adjudicatory fact-finding process" requiring "a detailed analysis, at the level of source code, of disputed [Fujitsu] programs and functionally similar IBM programs." For that reason, as well as the murky areas of a legal terrain still being mapped, they declined to render any opinion about the scope of copyright protection for either party's systems software.

What the arbitrators did was set themselves up as a semipermanent counseling service with the right to impose solutions that might save a deeply troubled relationship. The problem is that, while the 1983 agreement required IBM to seek arbitration, what it really wanted was divorce and alimony.

IBM After the Settlement

Sure, IBM will get some money that could help its fourth quarter net income, but it wanted it in a fashion that, if only for purposes of precedent, more clearly implicated Fujitsu in past sins. But the real rub is losing control of its own destiny, however temporarily.

The significance of the Secured Facility concession can be seen in the response of the chairman of ADAPSO. By the end of September, Jay Goldberg was thundering that it was "unthinkable" that some of the very same Japanese software developers whose threat had been used since 1983 to thwart ADAPSO requests for access to IBM source code could now rummage through the innards of Big Blue's operating systems while they still couldn't. Perhaps with an eye towards the uncertainties of SAA as well as its older concerns, Goldberg threatened a return to "the more aggressive advocacy of the past."

One approach he promised to explore was an antitrust action against the IBM-Fujitsu settlement. "Skin me, Brer Fox, snatch out my eyeballs, t'ar out my years by de roots, en cut off my legs, but do please, Brer Fox, don't fling me in dat brier patch." ADAPSO could probably do no bigger favor for IBM than successfully suing to overturn a system where the retired executive vice president of Norfolk Southern Corp. and the author of *Child, Family and State* will have the final say on Fujitsu's use of IBM source code for up to ten years.

In return, IBM could set up a Secured Facility to gain access to Fujitsu source code, but Thomas D. Barr, still the lead counsel for IBM, has stated that "IBM has no plans to exercise that right." It also won the right for the first time to run Fujitsu operating systems on IBM hardware, which might have some attractions in Japan. The Gray Sheet could imagine a

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scenario in which some users might be interested in running OSIV applications on one CPU of a partitioned 3090. The main thrust of this stipulation, though, seems to have been to yield IBM a debating point about Fujitsu double standards.

Fujitsu After the Settlement

The sigh of relief was almost audible. For the Japanese market, the lump paid-up license can quiet the fears of current users of its software, and the "external information" agreement can strengthen its position in multiuser environments. Fujitsu has told IDC Japan that over half of the large-scale M-Series systems sold in Japan last year went to customers who also had IBM systems and were often interested in sharing disk drives, terminals, and workstations. For the international market, Fujitsu can portray itself once more as an aggressive PCM alternative.

The second dividend is especially enticing, since Fujitsu's 4% drop in export revenue last year was due primarily to poor mainframe sales. It now seems likely that the rumor going the rounds this summer that Fujitsu would ship IBM-compatible mainframes to EDS in the U.S. was at least premature, since the project at hand turned out to be a deal with EDS Japan to supply an IBM-compatible M-780 to Isuzu Motors in Japan. But Fujitsu needs to cut some deals somewhere with somebody if it is to meet its goal of exporting 1,200 M-Series systems worth 150 billion yen ($1 billion) through 1990.

Will the settlement with IBM help? Maybe to some extent, but the Gray Sheet counsels caution. Ross Perot may be the only living American who could get away with massive imports of Japanese mainframes, and he's been forced out of EDS. And in Europe, Australia, and elsewhere, the memory of imbroglios like the Siemens mess may still rankle. Potential OEMs and end users will have to ask themselves how much to risk on the future decisions of two arbitrators in New York City, and for how long? The Contract Period, after all, could be as short as five years, and can be no longer than ten.

And there's another catch. A party (i.e., IBM) can decline to deliver requested code if it involves "fundamental and extraordinary software advances." If MVS/XB is announced in a year or two with performance gains for 3090s, IBM will surely claim that it falls within the excludable category. Even should the arbitrators rule otherwise on XB, it seems a safe bet that if a new operating system for the Summit generation were announced within the Contract Period, IBM would be able to exempt it from scrutiny. Fujitsu would be back in the same incompatible position into which XA thrust it in the early 1980s.

Software and Arbitration After the Settlement

ADAPSO to the contrary notwithstanding, the settlement was designed not to set a precedent — and that's one of the problems. Unlike a judicial ruling, arbitration cannot establish legally binding ground rules for the entire industry. This particular arbitration board even went out of its way to avoid expressing an opinion on the legal issues. Today no one (including IBM and Fujitsu) has a better idea of what is intellectual property in software than they had on September 14.

Nor are the broad issues the only ones awaiting resolution. The agreement at least gives IBM and Fujitsu a framework in which to settle disputes, but the disputes won't be any less severe. The Gray Sheet suspects that the arbitrators will have their hands full dealing with expansive demands by Fujitsu and with naysaying and footdragging by IBM.

With all due respect to Mr. Mnookin, the last word on the law's relation to family disputes may have been spoken by Mr. Bumble in *Oliver Twist*. Told that he was considered responsible for the acts of his termagant spouse, Bumble could only mutter, "If the law supposes that, the law is a ass — a idiot. If that's the eye of the law, the law is a bachelor; and the worst I wish the law is, that his eye may be opened by experience — by experience."

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• **CLIPPER DOCKS AT INTERGRAPH.** National Semi has had sad experience with microprocessors that missed the window to industry standard status. When it acquired Fairchild from Schlumberger, it didn't want another. But something potentially even sadder is being a customer with a nonstandard chip as the basis of your computer architecture.

The Clipper chipset was Fairchild's bid for the high-performance 32-bit market: a tightly integrated RISC/CISC combo billed as offering up to ten simultaneous operations (three pipelining phases, cache prefetch and lookup, etc.) in every 33MHz clock cycle. Alas, only one major customer -- Intergraph -- signed up. With the Fairchild sale, Intergraph was stuck with a chip that was not only nonstandard, but that might soon be nonexistent. It has swallowed hard and bought the rights to the Clipper chipset from National Semi.

• **GOVERNMENT GRADATES GOULD GROUNDING.** The GSA has restricted its suspension of Gould from government bids to the Imaging and Graphics Division that is the source of its overcharging complaint. This allows Gould once again to bid its computer systems for federal contracts and to get the planned divestiture of its defense units back on schedule for late 1987-early 1988.

• **TANDEM-STYLE NETVIEW.** Tandem has announced new Distributed Systems Management (DSM) software, due in 4Q1987, that allows managers of dispersed Tandem systems and networks to control activities from a single monitor. Included are traditional systems management tasks plus both physical and logical network management. Part of DSM is a product package, while the rest is being added to Tandem's proprietary Guardian 90 operating system.

This convergence of network and systems management is also a goal of the release of IBM's NetView due in 1Q1988; the catch for heavy OLTP users of both Tandem and IBM is that neither scheme is compatible with the other. Among other vendors, AT&T has announced a Unified Network Management Architecture based on the OSI Network Management Protocol that allows centralized or decentralized management of voice (we <u>are</u> talking about the phone company) and data networks, including access to NetView, but lacks the systems management component of the IBM and Tandem products.

• **CRAY CIRCUMVENTION.** After a press brouhaha in early September about the decision at Cray to cut the project to develop a new massively parallel processing supercomputer led by Steve Chen, who resigned in protest, Cray CEO John Rollwagen has let it be known that not only will the Chen-designed Y-MP follow-on to his successful X-MP systems ship next year, but a secret team had already begun work early this year on a less ambitious version of Chen's next supercomputer. Some version of the MP line will be available, then, alongside Seymour Cray's Cray-3 follow-on in the early 1990s.

• **NAS-TY BUSINESS.** IBM and the Commerce Department have fallen afoul of a 1986 regulation that added to the ban on export of most computer models to Soviet-controlled countries a requirement for Pentagon review of exports to Soviet-controlled corporations in other countries. IBM Germany signed a contract last year with Transnautic, a German shipping company staffed by West Germans but 51% owned by the Soviet Union, to replace a small 4381 with a bigger one. The Defense Department kept saying no, to the discomfort of IBM, the Commerce Department, Transnautic, and the West German government.

IBM finally received a green light from the Commerce Department (to the later anger of the Defense Department), only to learn that in the meantime Transnautic had bought an AS-8043 system from NAS instead. Although the Pentagon is miffed about the NAS deal too, it would have been permitted under the current revision of the regulation on the grounds that less than 10% of the value of NAS's Hitachi-designed mainframes represents U.S. content.

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REPORT

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New MicroVAX Systems Highlight Digital's Bar Mitzvah Bash; DEC Explores the Small-Scale Path to Long-Term Viability

Life begins at 30, or so Digital has reason to believe. But what happens then?

Thirty years ago, General Georges Doriot, the Harvard Business School guru who died on June 2, provided seed money from his American Research and Development Corp. (the first non-family-owned venture capital company in the U.S.) to enable a young researcher/entrepreneur named Ken Olsen to found a computer company. Digital's adolescence was marked by many highs and its share of lows, but today the company has come of age as the multiuser alternative to IBM.

DECworld '87, which opened in Boston the Tuesday after Labor Day, was conceived as an extravaganza celebrating this moment in the company's history. A year and a half ago, when the last DECworld was held in Boston, you had to prod execs to get them to give a figure on what it cost Digital. This time you get, with a smile, an immediate, nonchalant, "Oh, $20-30 million."

And then the rest of the numbers reel out: 27,000 customers attending for an average of three days, plus 10,000 employees, and God knows how many press and analysts (the Gray Sheet estimated 600 attendees at the September 9 press conference). 120,000 square feet of exhibition space at Boston's World Trade Center. 120 sessions on specialized topics, some of them on the Queen Elizabeth II and the Star-ship Oceania docked alongside to serve as meeting sites and floating hotels (even if rumbles were heard that steerage cabins on the QEII were only a little bigger than people's closets back home).

In a way, the chief exhibit was the large display of free copies of Digital's annual report for the fiscal year that ended on June 30. In case you've been locked in a Trappist monastery recently, net revenue was up $1.8 billion to $9.4 billion, representing growth of nearly 24%, while profits rocketed skyward 84% to pass the $1 billion mark. Digital's net income slightly surpassed its total revenue of ten years ago. The billion-dollar mark was also reached by Digital R&D expenses in FY1987.

The other tangible exhibit was a series of product introductions, led by a new family of MicroVAX products powered by a second-generation CMOS microprocessor. The other major announcement, the inauguration of the fifth phase of the Digital Network Architecture, is more promise than reality for now, although at least one significant element has been productized in MAILbus.

But don't shut your eyes to what the new products, especially the new MicroVAXs, reveal about Digital's preparations for the inevitable day when the company loses its current marketing momentum. Digital has been up before, and knows what the force of gravity says about things that go up. In fact, one of the most encouraging aspects of DECworld was the suggestion that, beneath all the hooplah, the company is as concerned with anticipating future problems as with basking in its current glory on DECchairs aboard the QEII. *continued on page 2*

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The MicroVAX 3000 Family

The gospel according to Digital was delivered to the great multitude eating fish and loaves at Anthony's Pier Four Restaurant by the voice of Ken Olsen himself: "The 9370 we thought never needed an answer." Which didn't stop his disciples from arguing that the new MicroVAX 3000 systems "outperform IBM's 9370 Model 60, at prices below the Model 20," in fact "less than half as much" on a five-year total cost basis.

Olsen's brusque comment nevertheless calls attention to an important point: the new systems are evolutionary developments that complete the upgrading of price/performance that began with the MicroVAX 2000 models this past winter. After all, the MicroVAX II line is now over two years old.

Within six months of the original MicroVAX II announcement in May 1985, some industry pundits were already prophesying the imminent arrival of the MicroVAX III. The Gray Sheet never could understand the logic at work here. Why mess around with the most popular product from Digital in years? You don't fix what ain't broke. However, second-generation MicroVAXs that won't ship in volume until the first quarter of 1988 are another, more rational story.

Systems that get VAXinated with the new CPU chip are reputedly 2.6-4.2 times more powerful than MicroVAX IIs. The average performance gain reported was 3.2, which suggests a basic performance level of 2.9 780-equivalents (or MIPS, or VAX MIPS, or whatever relative measure you prefer). The performance gains derive from two sources: refinements in the chip set, and (more importantly) a dual-level cache memory. CMOS technology gave Digital the room to add 1KB of cache on the CPU chip itself, as well as 64KB on the board.

The basic multiuser systems in the MicroVAX 3000 generation are the 3500 and 3600. Both are packaged in the new ruggedized format introduced in March, and both are, of course, Q-bus rather than VAXBI.

The 3500 is a pedestal configuration with a 280MB 5.25" fixed disk. The latter, entitled the RA70, is the first 5.25" disk drive designed and manufactured by Digital. It is currently available only on the 3XXX series, but its dual porting capability (a feature that other 5.25" disk manufacturers have ignored due to cost, and that probably explains the high price tag of $9,000 as a separate item) suggests that it will eventually migrate to 8XXX systems as well as other MicroVAX models. Standard ECC memory is 16MB, expandable to 32MB (twice the MVII capacity). The 3500, including a 1-20 user VMS license and VMS Services for MS-DOS or an Ultrix-32 license, starts at $74,800.

The 3600 comes in a 41" cabinet enclosure to make room for a standard 622MB 14" disk drive. A full 32MB of standard local memory is another clue that the 3600 is being positioned for memory-intensive technical computing (CAD, CASE, etc.), while the 3500 will be marketed in general-purpose environments. The 3600 starts at $99,800. An expanded cabinet model with two 622MB drives, a 1600/6250 BPI tape drive, and a 40-user VMS upgrade goes for $180K.

There are two workstation models so far in the new 3000 family, the VAXstation 3200 and 3500. Four models, two diskless, in the 3200 group all have a pedastal enclosure and 8MB of memory. Prices range from $19.9K for a diskless monochrome 3200 to $35K for an 8-plane color workstation with fixed disk. Two 3500 models come in an expandable enclosure with 16MB of memory and the new RA70 disk drive. The monochrome version goes for $50,400, and the color for $58,400. Both begin volume shipments in January or February.

Although the new VAXstations also ship with VMS, Digital is recognizing the centrality of Unix in the workstation world. A new version of Ultrix supports diskless workstations, including Sun workstations. Also, Ultrix Worksystem Software (UWS), a new product, is built around X Windows, with a window manager that allows resizing, restacking, moving, and

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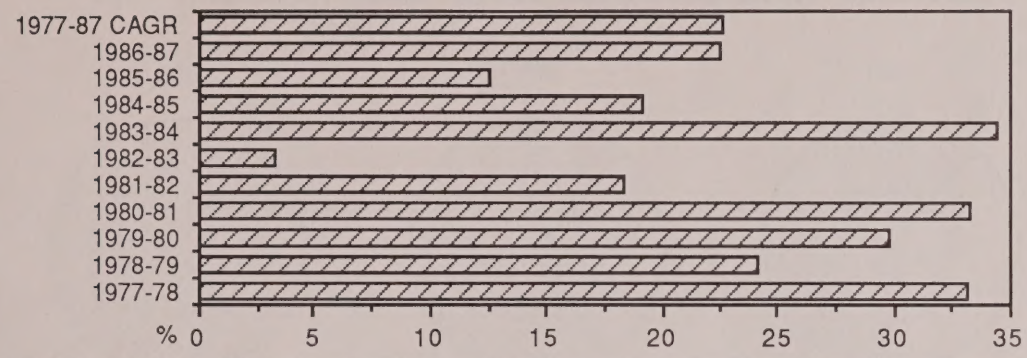
Annual Growth of Digital Product Revenue*, Fiscal 1977-Fiscal 1987

(Source: Digital Annual Report, 1987)



*Adjusted historically by Digital to reflect its new definitions, which merge hardware with software sales but transfer a percentage of current hardware revenue to maintenance to allow comparison with the period before one-year warranties.

iconifying of windowed data and a toolkit that simplifies software development of X-based applications. Even non-Ultrix users could benefit from looking at UWS, since X Windows will be standardized across the VAX line, including VMS systems.

The VAXstation 3200 and 3500 for the first time give Digital a range of workstations at different performance levels. It still lacks a workstation with 3-D capabilities; this could appear before the end of the year, though.

Olsen was defensive about the revenue performance of Digital workstations, arguing that if MicroVAXs doing essentially workstation-like work were added to VAXstation sales, Digital's results would look much better. The company also displayed a number of charts purportedly demonstrating that the new VAXstations, with their 2.9 780-equivalent average performance, actually "deliver 1.3 to 2 times the performance of so-called '4-MIPS' workstations" on typical applications rather than benchmarks. The key to the performance claim is the dual caching feature in the MicroVAX 3000 family.

Finally, three server configurations were offered, the VAXserver 3500, 3600, and 3602, with pricing from $49K to $105K. The 3600 is most directly comparable to the MicroVAX II-based VAXserver 100 (16MB of memory, 622MB disk, etc.), but gives triple the performance for only $2000 more ($66,900 vs. $65,000). Oddly, though, DECnet and Local Area VAXcluster software are bundled in the new VAXserver packages, but not the VMS Services for MS-DOS that come with the MicroVAX 3500 and 3600.

DECNET/OSI Phase V

Digital also officially launched Phase V of its network architecture, which is supposed to implement the company's commitment announced two years ago to migrate DNA to the emerging OSI standard sponsored by the International Standards Organization. The migration is expected to take three years.

One of the first elements of the top application layer of OSI, the X.400 E-mail standard, was launched at the 1987 Hannover Fair. Digital has replied with MAILbus, which links All-in-1 users with any E-mail systems that comply with X.400 protocols. One element is a gateway that also allows final-form interchange of documents between All-in-1 and IBM SNADS environments.

Digital's attitude towards X.400 is instructive. From one perspective, an international electronic mail standard is a real danger, since All-in-1 has been a moneymaker for DEC (both in its own right and as a source of new hardware sales) predominantly for its E-mail capabilities. However, Digital seems to have decided that, since X.400 is an inevitability, it might as well get out in front and make money from it. Digital will try to get customers to turn to it to set up X.400 E-mail systems across its multivendor environments, which could cut it a

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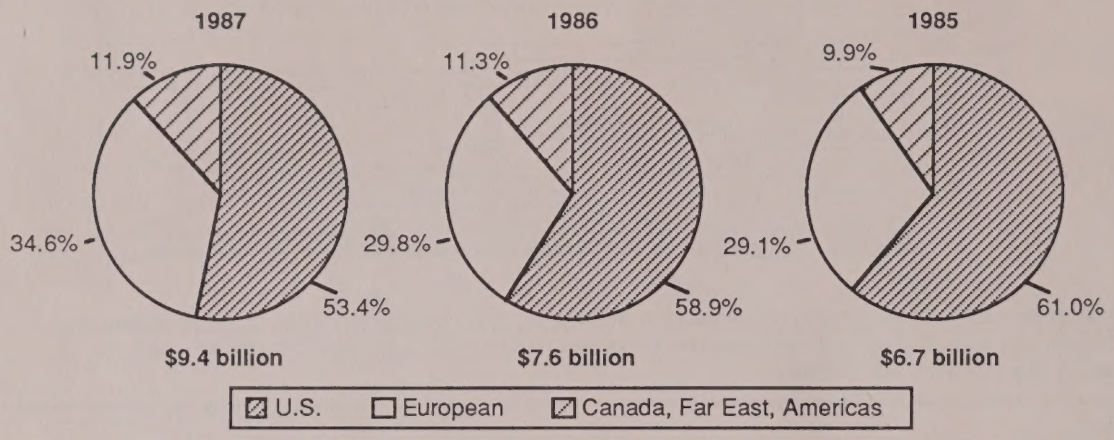
U.S., European, and Other International Proportions of Digital's Customer Revenue, Fiscal Years 1985, 1986, and 1987

(Source: Digital Annual Report, 1987)



considerable slice of a major systems integration business.

Planning for the Uncertain Future

This approach to X.400 is only one example of how Digital is preparing for the day when its current product line begins to lose its competitive edge. Prudence is necessary, because Olsen's soothsayers must be aware that the sheep entrails tell a more foreboding story than any mentioned at DECworld '87.

Digital revenues have historically ridden a roller coaster, as depicted in the graph of product sales growth on p. 3. One of the most interesting lessons from the graph is that the 22.6% growth registered in fiscal 1987 over the July 1985-June 1986 year, however estimable compared to other major systems vendors, in fact is fractionally below the company's 22.7% compound annual growth rate for product sales during the 1977-87 period.

Moreover, FY1987 growth was very uneven geographically. The growth rate for U.S. customer revenue (including maintenance and other services) was 12.2%, not that much better than the 9.7% U.S. growth achieved in the previous fiscal year, and just a tad better than half the 23.7% growth rate for total revenue.

Almost 70% of the $1.8 billion revenue growth over FY1986 was accrued internationally; this compares to 56% of the $900 million growth in FY1986. The international sector as a whole grew a little over 40%, compared to growth a little under 20% the previous year. The big bulge occurred in Europe, which grew about 44% compared to 16% a year earlier. The Canada/Far East/Americas sector kept up growth in the same 30% vicinity that it achieved in FY1986.

Once again it is necessary to point out the effect of currency conversion on international growth. Take the European bulge, for instance. In the July 1986-June 1987 period, the ECU (the EEC basket currency) appreciated on a weekly average basis around 23% against the dollar compared to the same period a year earlier. Now, one can't just subtract that percentage from Digital's European growth without assuming that its EEC sales were distributed between different countries in the exact same proportion as the ECU, and (this is the real catch) that Digital sales volume was evenly distributed in time over the two years. However, ECU appreciation does suggest that Digital's real growth in Europe was more in the vicinity of 15-20% (probably nearer 20%) than 40%.

Let's say, then, that Digital's real worldwide FY1987 revenue growth was 16-18%. This was admirable for a period that included the tail end of the slump, particularly compared to IBM's showing. But was it good enough?

Digital's incursions on IBM have been pretty much restricted to the midrange. It is a very

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IBM and Digital Shares of the Worldwide Value of 1986 Large-Scale, Midrange (Medium- and Small-Scale), and PC Shipments

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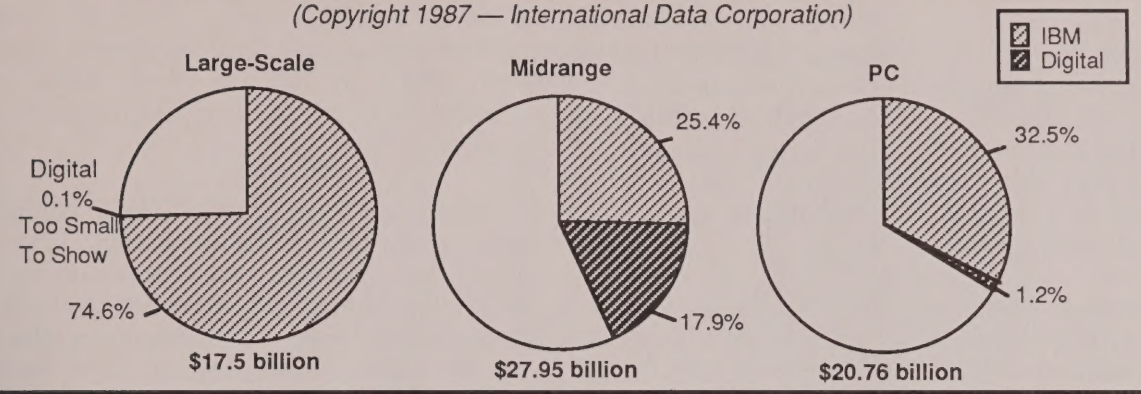

strong number two in a critical segment, but one that only accounted for around 42% of the value of worldwide 1986 shipments. The other 58% remains largely the domain of IBM and IBM-compatibility.

Digital has shown an interest in again being considered as a large-scale alternative to IBM, but on the basis of current technology, repackaged VAXclusters just won't cut it. Not only have mainframe customers been weaned on single-image processing, but many also demand high-performance OLTP functionality that Digital has as yet not delivered.

As for PCs, at the MicroVAX 3XXX announcement Ken Olsen admitted that the company has again had long and hard debates about the chances of succeeding in bringing the VAX architecture to personal computing. Some old arguments against it, particularly the memory and storage requirements to support 32-bit microprocessors, have been crumbling, as the new 80386-based PCs are proving.

Nevertheless, Olsen intimated that the decision was to stick with the status quo, if only because PC volume distribution requires retail expertise that Digital lacks. It will continue its efforts to network PCs with multiusersystems, and will explore further joint projects (at least informally) with Apple, the proprietary alternative to IBM at the PC level. However, for the nonce Digital is conceding the desktop to IBM and IBM-compatibility.

This means that DEC will mostly stay on its midrange turf for the next few years at least. However, there is a probable ceiling on its immediate growth prospects here. In a year or so IBM's approach to distributed processing with 9370s, the S/3X hybrid, and SAA could start to have an impact, and users could begin getting restive about the growth rate for commercially oriented software offerings for the VAX architecture.

How, then, can Digital insure future growth? The MicroVAX 3XXXs suggest one possible route that may have been marked out by Digital's trail guides.

Now, readers of the Gray Sheet are aware of our feeling that DEC growth has been too heavily weighted towards MicroVAX small-scale systems for comfort (see, for instance, Vol. 22, No. 21, March 10, 1987, and Vol. 23, No. 2-3, May 29, 1987). Its growth would have been even stronger if VAX 8XXXs, with their more expensive boxes, VAXBI peripherals, and software, took a more equal share. The new MicroVAXs, by reaching into the 3-MIPS range and up to 60 All-in-1 users, are even more potent threats to the 8250/8350 systems.

Nevertheless, the ultimate payoff may be worth the risk. If a ceiling is approaching, then it may make sense to get out as many VAX systems as possible as soon as possible. If sufficient volume is achieved now, Digital could have a large enough installed base of VAX systems to avoid being dislodged by IBM or others, and to begin luring users up from Q-bus to VAXBI systems. Taking 16-18% real growth now rather than, say, 25% growth is shrewd if it smooths out what could otherwise be a troublesome trough a couple of years from now.

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Preparing for the Peripherals Turnaround: IBM's Storage Announcements

Without stronger new-system sales, 3380-class storage has gotten stuck in a classic boom-bust cycle, with the PCMs countercyclical to IBM. Big Blue is coming off the bust cycle, while the PCMs have been basking in a boom. That's the context for IBM's series of mainframe storage announcements on August 31.

As noted earlier (e.g., the Gray Sheet, Vol. 22, No. 19-20, February 27, 1987), IBM's large-scale posture would have been more erect in 1986 but for the weak peripherals market, where U.S. revenue plummeted 24%, and worldwide 11%. IDC estimates that IBM's worldwide disk/tape revenue fell nearly 9%, to $4.7 billion. The precipitant was a poor performance by 3380 storage devices.

The problem is that the typical user's capacity requirements have not been growing as fast as the technology to support storage-intensive sites. Thus, while the number of worldwide double-capacity 3380s was over double the figure in 1985 (27,000 compared to 11,000), the overall number of IBM 3380 unit shipments fell nearly 15%. Double-capacity growth could not compensate for the 62% drop in single-capacity 3380 boxes shipped, from 37,000 to 14,000.

Absent a surge in the installed base during a strong large-scale transition, the growth jolt occurs during the period of initial shipment of a new generation of storage devices, when customers with the fastest growing needs for storage capacity can be added atop a still growing volume of buyers for the older technology. With the cost-per-megabyte trend line forever pushing southward, as soon as this high-volume mix is dissipated, so are revenue and profits. That's what happened to IBM last year.

The cost/capacity curve is maintained in part by PCM pressure, as soon as they are able to replicate or create comparable substitutes for IBM technology. In 1986, most had competitive 3380-class products, double capacity was easier to match than original single-density 3380s had been, and most mysteries of the 3880-23 controller had been unraveled. As a result, IBM's share of unit 3380 shipments dropped from 85.5% in 1985 to 78.3%, while NAS, Amdahl, STK, and Memorex each posted gains in market share.

There was little sign of major change in these trends for the first half of 1987. The only significant difference has been among the PCMs, where StorageTek growth has been stymied and the Japanese manufacturers who supply the two current leaders have changed places. Just as the big winner in 1986 was Hitachi/NAS, the accolades in 1987 are going to Fujitsu/Amdahl.

Ergo IBM's August 31 announcement. Three new 3380 subsystem groups were unveiled, two of them available in October (the J and K devices), and one waiting in the wings for 3Q1988 (the CJ2). Together they represent a classic mid-to-endlife kicker that should lift 1987 results into the plus side again.

The 3380-K is, as expected, triple-capacity, but costs about what a double-capacity 3380-E would have gone for before prices were cut on August 31. Even now, at $128,000 for a head-of-string model or $105K for a slave, a 3380-K costs only $15,000 more than a comparable E. This means that for a capacity of 7.5GB (by IBM's calculations "the equivalent of the information contained in 34 sets of an encyclopedia, of 32 volumes each"), the cost/MB would be $14 or $17.

Plus other improvements: a minimum seek time of 2 milliseconds, down from 3ms; an average seek time of 16ms, compared to 17ms for an E; and the logic to support quad pathing when controllers are available that offer it (more anon).

The 3380-J is a single-capacity replacement for the D, with the K's quad pathing potential and minimum seek time plus an average seek time of 12ms. It can be upgraded to a K and intermixed with it on the same string, but miscegenation of either with D or E models on the same string is verboten.

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Vendor Shares of Worldwide 3380-Compatible Storage Device Unit Shipments, 1986 Vs. 1985

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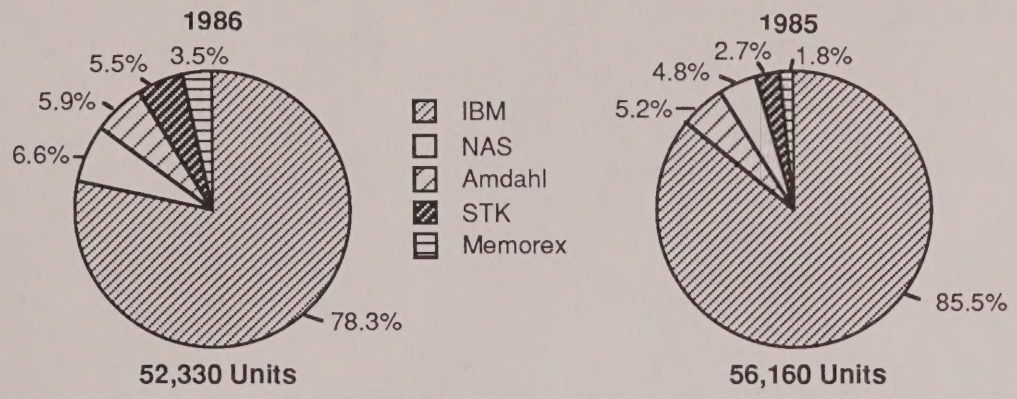

The J costs the same as a D after the old single-capacity 3380 was repriced: $82,000 for head-of-string, $59,000 for slave.

Finally, the CJ2 will be a $70,000 controller/DASD twofer, combining 1.26GB of storage with control paths that attach directly to 3MB/sec processor channels. Its minimum and average seek times will be the same as a K. With the ability to attach up to three J or K slaves, it can be a way for 4381 or upper-level 9370 environments to save the expense of a controller.

Ah, the controller. The new disks are comely, but the new 3990 controller is sexy. Powered by a processor unit equivalent to a 3090-180, it will come in three models starting in 3Q1988. Model 1 adds little to current 3880 offerings except upgradability, but for $110K Model 2 will offer quad pathing, with the potential of doubling DASD throughput over the dual pathing (one each direction) that IBM borrowed from the PCMs for D and E devices.

And then there's Model 3, which adds cache of 32-256MB to quad pathing (today's top-of-the-line 3880s offer only 16-64MB of cache) for $200K-984K. To make better use of the cache, a Cache Fast Write feature for temporary work files that do not require DASD storage is standard. And the Model 3 introduces 4.5MB/sec cache-to-host data transfer rates for 3090s equipped with 4.5MB/sec channel support (all new Sierra shipments starting on October 30, with an engineering change for the installed base available at the same time).

And there's more. In 4Q1988 "extended functions" of the 3990-3 will arrive: Dual Copy and DASD Fast Write. Dual Copy is, in essence, volume shadowing for fault tolerance. DASD Fast Write will save time by temporarily keeping data intended for DASD storage in cache and 4MB of local nonvolatile storage until it can be asynchronously transferred without clogging the channels.

The new disk drives will help IBM's bottom line for the fourth quarter of 1987. IDC currently expects that 10,000 Ks and 3,000 Js will ship this year, with about triple that volume in 1988. The 1987 figures might have been higher except for the year delay on quad pathing until the new 3990s ship, as some users will choose to make do with used 3380s until then.

The new drives will slow the momentum of the PCMs, which will have to cut prices near the bone (if not deeper) during the year or two it will take them to clone a new generation of 3380s. What could really put on the brakes, though, is the 3990, clones of which probably can't be expected until 1991 or so. And by then new storage options will be offered by IBM in connection with the "Summit" generation of mainframes. For the next few years, the storage scorecard reads Advantage, IBM.

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- **UNISYS A-1 SAUCE TO MAKE STEAKBURGERS TASTE LIKE HAMBURGERS.** No, that's not a snide comment — it's a strategic direction. The A-1 is the point man in front of the A4 and A6 in the new Unisys (Burroughs side) platoon of so-called "smallframes." The object is to take the A-Series architecture and operating system to a new price/performance point where it can compete more effectively than its A2 predecessor with other small-scale systems.

  The "smallframes" are designed to allow Unisys to claim "mainframe power, growth and functionality with the size and price point of a minicomputer." Although the A1 engine is not particularly potent, and the price when you add in the system prereqs is not cheap, it does offer a mainframe-oriented architecture and software. The goal is volume sales of the A1 into new accounts (in fact, one top exec says he won't be happy unless 70% are sold there) that can later be migrated up within the company's proprietary architecture.

  One interesting aspect of the A1 strategy is the glimpse it affords of a possible realignment of Unisys families. Although hitherto the chief distinction in the marketing of former Burroughs and Sperry lines has been the lines of business in which they are emphasized, some at Unisys feel that the center of gravity of the "A" series should be fairly low, and that the only high-performance mainframe line in the future should be the (Sperry) 1100 and its successor. With the only links between the incompatible architectures currently at the 4GL level on PC workstations, the strategy would take years to work out, but it could begin dictating the direction of R&D efforts.

- **3B OR NOT 3B?** Well, not PC anyway. After its abortive Unix PC move, AT&T is positioning the 6386 WorkGroup System, an 80386-based supermicro, as a small-scale system for the desktop that also happens to run MS-DOS/OS2 applications (up to 8 simultaneously) as well as Unix/Xenix V. It also unveiled the 3B4000, a high-end multiprocessor system that can grow to 15 CPUs and a claimed 43 MIPS. Taken together, the new products are the best omens to date that the Cassoni regime can succeed where its forerunners faltered.

- **NEW IBM TACTICS IN JAPAN.** In an unprecedented move, IBM will OEM its Personal System 55 PC and S/36 boxes to Ricoh for resale in Japan under Ricoh's own label starting next April. IDC Japan has told the Gray Sheet that this is only the first increment in a new IBM "systems integration" strategy to reinvigorate its Japanese sales by alliances with some of the major vendors who do not, like Fujitsu, Hitachi, and NEC, offer their own mainframe lines. Other candidates include Toshiba, Mitsubishi, and Oki. IBM would reciprocate by incorporating some of their products in its own catalogue.

- **WHAT'S HOT AT MCC.** The Board of Directors of MCC (lagging a little behind the newsweeklies) has formally approved a new program investigating applications of high-temperature superconductors. It will be headed by the former technical director of MCC's semiconductor packaging and interconnect program, which in turn is being reorganized into, on the one hand, a core research effort in which all participants will share, and, on the other, smaller satellite areas for more intensive research. This dual track approach is one of the innovations sponsored by Grant Dove, the corporation's new CEO.

- **AMSTRAD TARGETS THE U.S.** In a signal that it finally feels ready to tackle the U.S. market head-on, Amstrad, Europe's leading IBM-compatible PC vendor, has bought out the American distributor that handled its products for two years. In that time "we have learnt a lot (sic)," and "now feel the time is right to launch the type of marketing programme (sic) for which Amstrad has become famous." What they haven't learned yet is that American stylists try to avoid writing "sic," because most readers assume it means a mistake.

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THE GRAY SHEET
Computer Industry
REPORT

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Going for the Rebound: The Center in a Blue Uniform is Still on Crutches, but Most of the Other Players are Scoring

Since two consecutive down quarters is the official government definition of a recession, then it follows that two consecutive quarters of positive movement should probably be the operating definition of a rebound. If so, then it is fair to say that the computer industry is rebounding, even if it is really not escaping the Great Softness.

All of the financial results from the second quarter of calendar 1987 for the over 80 public industry companies that the Gray Sheet is tracking this year are in (for first quarter results, see Vol. 23, No. 1, May 2, 1987). In the aggregate, they're deja vu all over again:

- The total revenue growth over the comparable quarter in 1986 was 10.3%, compared to 9.9% in the first quarter. Not surprisingly, the growth over the first half of 1987 over the first six months of 1986 was 10.1%.

- Growth on the bottom line was a little weaker than in the first quarter, but not by much. Overall the net income of companies in the sample was up 17.5% for the quarter, compared to growth of 23.8% in 1Q1987. Income growth for the first half of 1987 was therefore up 20.3% — almost exactly double the rate for revenue growth.

- In the industry segments into which the Gray Sheet has divided the companies involved, the computer systems group (which represents over 80% of the total revenue in the sample) was a carbon copy of the first quarter — up 7.9% in revenue for each quarter and consequently the half, up 9.1% in income compared to the 9.7% in the first quarter.

- The peripherals/communications group again evidenced the strongest rebound in the sample — up 27.5% for the quarter in revenue, and up 36.4% in income (the comparable figures for the first quarter were 34.2% and 52.6%). The software/services/VARs segment did not lag far behind, with 19.5% growth in revenue and 17.4% in income (compared to 22.8% and 29.5% in the first quarter). The semiconductors/components sector repeated the roughly 10% revenue growth of the first quarter, and this time all companies in this part of the sample registered profits.

The mirror image of the first quarter, it should be noted, is a bit of a mirage. For a number of companies, the second quarter was much better than the overall totals indicate, at least in revenue growth. Skewing the sample (as it is wont to do, one way or the other) is IBM, which represents 45% of the sample's computer systems revenue and about 38% of the overall total.

- Without Big Blue, the systems sector would have been up 11.4% for the quarter in revenue, and 44.8% in income (10.6% and 57.4% respectively for the half).

- Without IBM, the overall total would have been up 13.9% in revenue and 61.5% in income

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for the quarter (13.5% and 77.8% for the half).

- IBM's share of total net income from the sample was 61.7% for the first half of 1986; for the first half of this year, it is down to 43.3%.

The biggest success stories among systems vendors were mostly familiar names from the first quarter. Digital's 22.7% rise in revenue for the second quarter, for example, allowed a 23.8% revenue gain for the half. So far in 1987 its sales (hardware plus software, minus a slice of hardware revenue that goes to the maintenance category — see the Gray Sheet, Vol. 23, No. 5-6, August 3, 1987) are up 21.7% over the first half of 1986, at a tad under $3.5 billion. As a result Digital's sales grew from 17.0% of IBM's most directly comparable revenue (the sales and program products categories) in the first half of 1986 to 19.2% for January-June 1987.

Several of Digital's midscale competitors displayed potent growth, even if they could not match the Maynard, Mass., mauler's knockout record. NCR still moves from strength to strength, with total revenue growing 16.3% so far in 1987, and sales swelling even faster at just under 20%. Revenue results for the first half of 1987 at Wang and Prime were up 12.0% and 12.4% respectively, while HP's February-July revenue was up 14.0%. Hewlett-Packard's total equipment sales for this period were up 12.2%, although growth in the equipment category including information systems was a little less robust at 9.1%.

The fault-tolerant/OLTP niche continues to outpace the broader midscale market. Tandem registered 34.2% total revenue growth for the half (36.0% in product revenue), and Stratus weighed in with 40.4% growth so far in 1987, including a higher percentage in the second quarter from its OEM relationships with IBM and Olivetti. Part of NCR's growth also belongs in this category.

Customer confusion after IBM's PS/2 announcement has helped rather than hurt some major PC players, notably Compaq (up 64.4% for the half, largely on the strength of 81.8% growth in the second quarter), and did not affect the leading non-IBM-compatible vendor (Apple was up 41.4% in revenue for the half, and 42.1% for the second quarter).

In the accelerating technical workstation market, Apollo continued its rebound, with revenue growth for the first half of 1987 of 50.0% pretty evenly divided between the two quarters involved. Its recovery would be even bigger news if it weren't in Sun's shadow. Sun much better than doubled its 1986 revenue during each of the first two quarters of 1987, with growth for the first half of the year reaching 144.0%. Amazingly enough, Sun's total revenue in 1987 is to date 28% above Apollo's.

In peripherals, some of the storage players continue to rebound nicely (e.g., Maxtor, Miniscribe, and Seagate). In software, the two participants in the year's biggest merger, Computer Associates and Uccel, both had strong first halves of 1987, if only due to previous acquisitions by both. Among the PC software giants, the second quarter for Lotus showed sturdier growth than the first, and for Microsoft a somewhat lower growth rate than in 1Q1987, but the Gates mates were still growing faster. For the first half of 1987 Microsoft's growth rate was 76.2%, and for Lotus 32.0%; so far this year Microsoft's revenue is some 11% above the total tallied by the former software leader.

Obviously, if these vendors were the whole story, the overall growth rates would be much higher. IBM's year to date and DG's travails have already been analyzed in these pages in the August 3 issue. Control Data slipped 5.1% in revenue and had to post a $5.5 million loss for the quarter, in large part due to problems with its FSD II disk drive; the replacement program is turning out to be an even bigger headache than CDC feared, and a large one-time charge is expected once the company figures out the probable cost. Cray revenue fell 30.6% for the quarter, a development for which the company had prepared people by noting a shift to leases rather than purchases for the period. In another arena, StorageTek seems to be hitting at least a temporary ceiling in its attempt to rise from the ashes of Chapter 11.

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Percentage Change of Dollar Exchange Rate of Selected Currencies by Week*, January-June 1987

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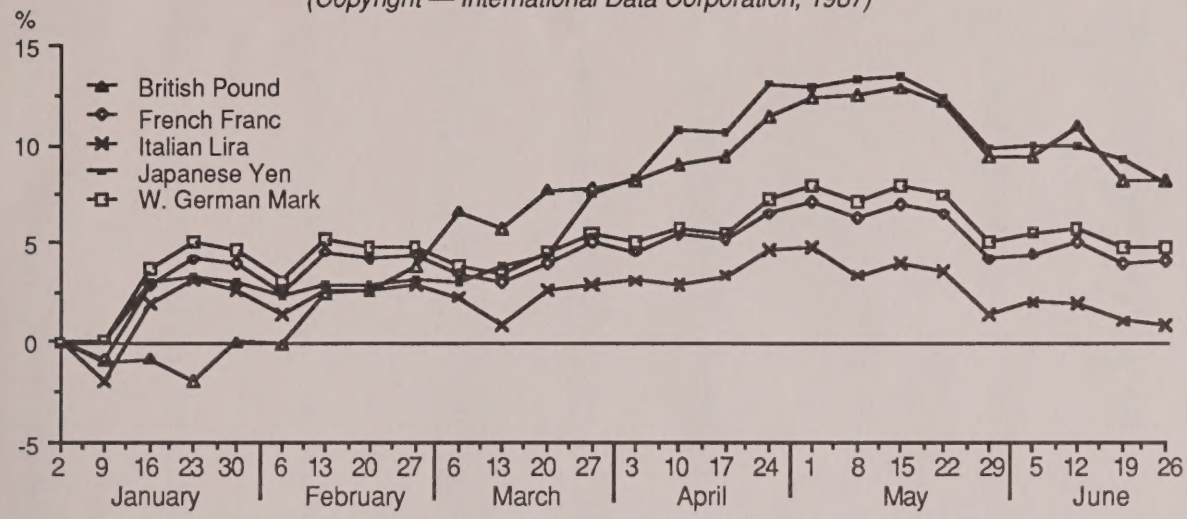

*Percentage change from rates on January 2, 1987; currency position at the close of trading on Friday of each week.

It should be noted that, for two major systems vendors, there are very inadequate gauges for measuring their progress in 1987. Unisys seems at first blush to have nearly doubled its revenue for the first half of the year with an 89.6% growth rate, and to have increased its income 151%. However, it is comparing its current performance only with the Burroughs half of the merged company. The Gray Sheet has incorporated Sperry results from 1986 in our sample to correct for this bias, even though last year Sperry included non-computer-related divisions that Unisys has since divested. Also, there are no figures available to compare against Honeywell Bull's 1987 results ($508.2 million for the second quarter, and $932.2 million for the half).

Two other caveats should be borne in mind. The high growth in net income is in some cases a one-time phenomenon resulting from nonrecurring credits, often tax carryforwards from earlier losses in the depths of the Great Softness. Among the recipients were Alliant, Boole and Babbage, Chips & Technologies, Cipher Data, CCI, CDC, Convex, Cypress Semiconductor, Daisy Systems, Data General, Gould, Intel, Interleaf, MAI Basic Four, MASSCOMP, Pyramid, Quantum, Rexon, Silicon Graphics, StorageTek, TI, and Western Digital.

And then there is the strongly positive effect of currency conversions for both revenue and income in the case of vendors with a strong international presence. The renewed weakening of the dollar in the second half of August is a reminder that most sales abroad continue to add an unearned increment from the position of the dollar relative to local currencies.

To measure the size of this increment, the Gray Sheet this year has been maintaining a spreadsheet tracking weekly currency fluctuations as of the end of trading each Friday. The second quarter saw a distinct moderation in the dollar's depreciation, although this was apparently a temporary respite. The average weekly value of a pound was up 1.9% against the dollar, of a franc up .7%, of a lira down .2%, of a yen up 2.4%, and of a Deutschmark up 1.0%. For the year to date, though, the pound average was up 6.8%, the franc up 4.3%, the lira up 2.4%, the yen up 7.0%, and the mark up 5.0%.

To evaluate the yearly financial comparisons offered by vendors, though, we must also include the strong appreciation of these currencies in the second half of 1986. Thus the average weekly value of the pound in the second quarter of 1987 was up 9.0% from 2Q1986, of the franc up 18.7%, of the lira up 18.5%, of the yen up 19.0%, and of the Deutschmark up 24.3%.

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SELECTED INFORMATION INDUSTRY FINANCIAL RESULTS, SECOND QUARTER 1987, $M

(Source: Company Financial Reports)

Category/Company	2Q87 Rev	2Q86 Rev	% Change	2Q87 Ear	2Q86 Ear	% Change
Computer Systems						
Alliant	13.4	5.9	125.4%	1.7	0.7	148.1%
Altos*	40.5	26.8	40.6%	3.0	0.8	275.0%
Amdahl	341.0	209.3	62.9%	31.0	2.7	1044.7%
Apollo	132.2	88.4	49.6%	7.6	1.0	630.5%
Apple	637.1	448.3	42.1%	53.5	32.3	65.4%
Compaq	267.5	147.1	81.8%	30.7	9.3	230.9%
Computer Consoles	35.8	33.1	8.2%	0.9	(0.9)	NA
Control Data	785.9	828.5	-5.1%	(5.5)	(7.8)	NA
Convergent Tech	104.7	74.2	41.1%	0.1	(11.0)	NA
Convex	16.7	9.1	83.6%	2.2	0.9	142.2%
Cray	124.9	179.9	-30.6%	19.6	44.5	-55.8%
Data General*	313.6	325.3	-3.6%	(65.1)	(2.0)	NA
Digital	2,669.1	2,175.7	22.7%	377.3	238.6	58.1%
Gould	232.5	225.7	3.0%	3.5	4.3	-18.6%
Harris	570.3	587.0	-2.9%	26.2	16.9	54.9%
Hewlett-Packard*	2,054.0	1,794.0	14.5%	148.0	123.0	20.3%
IBM	12,798.0	12,268.0	4.3%	1,178.0	1,305.0	-9.7%
Kaypro	26.2	20.6	27.1%	(0.8)	0.8	NA
MAI Basic Four	79.1	69.5	13.9%	6.8	4.0	69.9%
MASSCOMP	21.1	15.5	36.2%	2.7	0.8	253.9%
NBI	67.1	73.5	-8.8%	(0.4)	(2.8)	NA
NCR	1,359.6	1,168.8	16.3%	98.6	78.8	25.1%
Prime	236.0	210.5	12.1%	15.7	11.4	37.3%
Pyramid	13.7	10.0	36.6%	0.8	(2.1)	NA
Silicon Graphics	29.1	14.2	104.4%	3.4	1.3	163.8%
Sperry	0.0	1,225.4	NA	0.0	6.8	NA
Stratus	42.7	30.2	41.7%	3.9	3.3	17.9%
Sun Microsystems	185.9	76.7	142.4%	10.9	5.5	98.1%
Tandem	264.0	200.9	31.4%	25.6	18.1	41.3%
Tandy	736.7	690.8	6.6%	44.4	34.0	30.6%
Unisys	2,275.0	1,337.6	70.1%	121.2	76.2	59.1%
Wang	824.0	716.8	15.0%	32.0	0.8	3900.0%
Subtotal	**27,297.3**	**25,289.3**	**7.9%**	**2,177.5**	**1,995.3**	**9.1%**
Peripherals and Communications						
Alloy	12.1	9.2	31.4%	0.8	0.2	285.8%
AST Research	40.0	63.2	-36.6%	4.1	2.9	43.7%
Bridge	17.1	10.2	68.0%	1.8	1.1	71.7%
Britton Lee	5.3	7.4	-28.1%	(4.2)	(0.3)	NA
Cipher Data	42.2	50.6	-16.5%	1.0	3.8	-72.4%
Dataproducts	77.4	84.4	-8.3%	0.3	2.5	-86.7%
Emulex	27.4	27.9	-2.0%	0.2	2.3	-89.2%
Irwin Magnetic Sys	11.5	10.3	12.5%	0.8	1.0	-22.4%
Key Tronic	29.1	27.1	7.4%	1.6	(1.7)	NA
Maxtor*	50.9	34.0	49.8%	1.7	4.3	-59.9%
Micropolis	70.9	55.3	28.4%	6.8	4.4	53.3%
Miniscribe	81.1	43.7	85.3%	7.6	5.6	36.3%
Network Systems	30.6	26.1	17.0%	4.9	3.8	30.4%
Priam	35.1	28.5	23.3%	(2.8)	(4.5)	NA
Quantum	40.2	25.3	58.7%	(3.5)	2.5	NA
Rexon	27.7	14.9	85.8%	2.8	0.9	211.3%
Seagate	250.1	141.5	76.7%	37.2	16.4	126.6%
StorageTek	175.3	171.7	2.1%	8.8	13.8	-36.4%
Tandon	81.8	51.8	57.9%	5.6	(20.3)	NA
Ungermann-Bass	36.2	22.7	59.8%	1.2	(3.9)	NA
Western Digital	140.3	88.1	59.4%	15.6	8.2	89.6%
Wyse	80.0	52.6	52.2%	5.7	4.0	40.6%
Xebec	10.3	29.9	-65.5%	(33.9)	0.0	NA
Subtotal	**1,372.8**	**1,076.4**	**27.5%**	**64.1**	**47.0**	**36.4%**
Software/Services/VARs						
Ask Computer	31.4	26.6	18.1%	2.6	2.0	28.5%
ADP	355.3	318.6	11.5%	40.1	30.9	29.6%
Boole & Babbage	10.3	8.7	18.8%	0.5	0.2	118.0%
Comdisco	271.4	248.8	9.1%	25.5	19.8	28.8%
Computer Associates	89.2	50.1	78.1%	4.1	2.4	73.9%
Computer Sciences	274.6	234.0	17.4%	9.5	6.7	42.2%
Computervision	136.5	119.3	14.4%	4.1	(3.4)	NA
Cullinet*	49.0	33.2	47.5%	(8.0)	(11.4)	NA
Cybertek	5.2	6.5	-21.3%	(0.3)	0.6	NA
Daisy Systems	24.1	23.1	4.2%	(10.5)	(1.8)	NA
Data I/O	16.8	16.8	0.3%	0.6	1.3	-56.3%
Informix	9.1	4.6	97.6%	1.2	0.5	157.0%
Intellicorp	5.8	5.4	6.3%	(2.7)	3.8	NA
Intergraph	160.2	150.4	6.5%	16.8	17.3	-3.4%
Interleaf	10.5	6.4	64.4%	0.7	(1.2)	NA
Lotus	94.0	66.2	42.0%	16.3	11.8	37.7%
MSA	60.1	47.6	26.4%	(1.0)	5.9	NA
Mentor Graphics	53.9	42.1	28.1%	4.7	2.3	107.9%
Microsoft	99.8	62.0	61.0%	17.3	11.5	50.0%
Software Pub.	8.3	4.6	80.6%	0.9	(0.7)	NA
Symbolics	29.2	31.7	-8.0%	(1.5)	1.7	NA
UCCEL	47.7	34.2	39.4%	4.4	5.4	-17.4%
VM Software	6.8	6.2	8.6%	0.1	1.0	-88.0%
Subtotal	**1,848.3**	**1,547.2**	**19.5%**	**125.2**	**106.6**	**17.4%**
Semiconductors/Components						
AMD	192.4	153.9	25.0%	4.1	(28.0)	NA
Chips & Techs.	27.6	7.1	286.0%	4.0	1.4	193.2%
Cypress	17.0	12.3	38.7%	3.5	3.3	7.1%
Intel	439.0	305.2	43.8%	46.5	(22.9)	NA
LSI Logic	59.9	47.9	24.9%	0.3	0.8	-66.5%
Texas Instruments	1,371.6	1,244.1	10.2%	61.9	12.3	403.3%
Subtotal	**2,107.4**	**1,770.6**	**19.0%**	**120.2**	**(33.2)**	**NA**
TOTAL	**32,626.7**	**29,683.5**	**9.9%**	**2,487.0**	**2,115.8**	**17.5%**

*HP and Cullinet for quarter ending July 31. Altos 2Q income includes $1.1M gain from sale of Informix investment. Data General 2Q earnings include $53.8 million restructuring charge. Maxtor 1986 results adjusted to reflect acquisition of U.S. Design. Western Digital 1986 figures restated to reflect Paradise acquisition.

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SELECTED INFORMATION INDUSTRY FINANCIAL RESULTS, FIRST HALF 1987, $M

(Source: Company Financial Reports)

Category/Company	1H87 Rev	1H86 Rev	% Change	1H87 Ear	1H86 Ear	% Change
Computer Systems						
Alliant	25.4	9.9	156.3%	4.2	1.2	250.0%
Altos	80.9	66.5	21.7%	5.8	3.9	48.7%
Amdahl	659.5	409.6	61.0%	56.2	5.1	996.8%
Apollo	255.6	170.4	50.0%	14.0	1.6	788.2%
Apple	1,212.4	857.2	41.4%	87.3	64.1	36.2%
Compaq	478.5	291.1	64.4%	50.8	17.6	188.8%
Computer Consoles	71.4	54.3	31.5%	1.7	(-6.5)	NA
Control Data	1,607.6	1,624.6	(-1.0%)	1.7	(-29.0)	NA
Convergent Tech	178.2	163.7	8.9%	(-10.9)	(-8.9)	NA
Convex	31.1	16.6	87.4%	4.3	1.4	197.4%
Cray	339.1	321.9	5.3%	76.9	75.4	2.0%
Data General	628.8	644.1	(-2.4%)	(-107.7)	(-3.8)	NA
Digital	5,079.1	4103.9	23.8%	684.8	409.0	67.5%
Gould	460.1	454.0	1.3%	11.1	(-110.8)	NA
Harris	1,092.5	1104.3	(-1.1%)	48.1	32.2	49.4%
Hewlett-Packard*	4,071.0	3,572.0	14.0%	310.0	250.0	24.0%
IBM	23,479.0	22,395.0	4.8%	1,963.0	2,322.0	(-15.5%)
Kaypro	55.1	41.1	34.1%	0.0	1.6	(-97.0%)
MAI Basic Four	157.2	140.2	12.1%	12.2	8.1	51.4%
MASSCOMP	41.5	29.6	39.9%	4.3	1.3	221.7%
NBI	136.3	141.1	(-3.4%)	(-1.3)	-5.1	NA
NCR	2,481.1	2,129.6	16.5%	160.2	129.1	24.1%
Prime	457.8	407.4	12.4%	27.6	20.7	33.3%
Pyramid	26.3	21.1	24.5%	1.2	(-1.3)	NA
Silicon Graphics	51.6	24.7	109.1%	6.2	1.7	265.6%
Sperry	0.0	3,026.5	NA	0.0	122.1	NA
Stratus	80.2	57.1	40.4%	7.6	6.3	19.7%
Sun Microsystems	327.6	134.3	144.0%	21.1	8.9	137.3%
Tandem	505.3	377.2	34.2%	48.1	30.5	57.4%
Tandy	1,513.6	1,384.2	9.3%	94.8	76.1	24.6%
Unisys	4,690.8	2,473.6	89.6%	231.4	92.2	151.0%
Wang	1,569.9	1,402.1	12.0%	37.9	6.1	526.4%
Subtotal	**51,845.5**	**48,049.0**	**7.9%**	**3,852.7**	**3,522.7**	**9.4%**
Peripherals and Communications						
Alloy	22.9	19.2	19.2%	1.6	0.9	88.1%
AST Research	95.5	104.7	(-8.8%)	7.5	9.3	(-19.5%)
Bridge	32.5	19.4	67.1%	3.5	2.1	66.3%
Britton Lee	11.0	14.7	(-24.8%)	(-6.2)	(-0.1)	NA
Cipher Data	88.2	90.8	(-2.9%)	2.4	5.5	(-57.5%)
Dataproducts	162.3	181.4	(-10.5%)	2.0	8.0	(-75.0%)
Emulex	53.1	55.1	(-3.6%)	1.5	4.5	(-65.7%)
Irwin Magnetic Sys	26.1	20.4	27.9%	2.0	2.5	(-21.1%)
Key Tronic	62.8	62.4	0.5%	2.5	(-0.)4	NA
Maxtor	104.8	60.5	73.3%	9.7	8.2	19.2%
Micropolis	132.7	105.9	25.3%	13.0	8.2	59.0%
Miniscribe	142.5	84.1	69.4%	13.7	10.3	33.1%
Network Systems	50.8	50.1	1.5%	6.0	6.9	(-11.7%)
Priam	71.3	64.6	10.2%	(-2.7)	(-2.0)	NA
Quantum	72.1	53.0	36.0%	(-0.6)	8.3	NA
Rexon	51.9	28.6	81.4%	4.8	1.7	179.5%
Seagate	517.1	268.5	92.6%	77.6	28.2	174.9%
StorageTek	355.9	333.2	6.8%	23.1	18.8	22.5%
Tandon	162.1	109.9	47.5%	10.7	(-18.3)	NA
Ungermann-Bass	67.4	48.8	38.1%	2.4	(-3.1)	NA
Western Digital	262.3	164.4	59.5%	26.1	15.0	87.2%
Wyse	156.0	98.9	59.7%	10.8	7.7	40.6%
Xebec	32.9	53.9	(-38.9%)	(-36.0)	(-1.9)	NA
Subtotal	**2,736.2**	**2,092.6**	**30.8%**	**177.4**	**121.2**	**46.3%**
Software/Services/VARs						
Ask Computer	56.8	44.2	28.5%	4.2	3.4	25.1%
ADP	729.0	642.8	13.4%	79.3	62.8	26.4%
Boole & Babbage	20.3	17.3	17.3%	1.0	0.6	66.1%
Comdisco	547.8	466.4	17.5%	54.0	36.1	49.4%
Computer Associates	191.2	107.6	77.5%	15.3	7.7	99.6%
Computer Sciences	565.2	470.8	20.0%	20.3	15.5	30.8%
Computervision	276.4	232.3	19.0%	9.9	(-10.4)	NA
Cullinet*	110.1	88.8	24.0%	(-12.1)	(-7.7)	NA
Cybertek	11.6	13.9	(-17.0%)	0.0	1.5	(-98.0%)
Daisy Systems	47.9	45.6	5.1%	(-15.4)	(-6.5)	NA
Data I/O	33.5	32.9	2.1%	1.6	2.5	(-36.5%)
Informix	16.3	8.8	85.6%	2.0	0.8	145.5%
Intellicorp	11.3	10.9	4.4%	(-2.6)	4.4	NA
Intergraph	288.7	297.4	(-2.9%)	26.8	35.3	(-24.3%)
Interleaf	22.3	13.2	68.5%	1.4	(-0.9)	NA
Lotus	178.8	135.5	32.0%	30.0	23.2	29.3%
MSA	106.7	77.0	38.5%	(-6.2)	5.5	NA
Mentor Graphics	104.4	79.2	31.9%	8.9	4.2	113.3%
Microsoft	198.1	112.5	76.2%	36.4	22.1	64.2%
Software Pub.	19.2	10.3	86.3%	2.5	(-0.4)	NA
Symbolics	53.8	62.6	(-14.1%)	(-3.5)	5.2	NA
UCCEL	90.5	68.3	32.5%	10.3	7.8	31.7%
VM Software	13.1	10.6	23.9%	0.9	1.6	(-43.9%)
Subtotal	**3,692.8**	**3,048.8**	**21.1%**	**264.9**	**214.5**	**23.5%**
Semiconductors/Components						
AMD	362.5	307.3	18.0%	0.8	(-47.1)	NA
Chips & Techs.	50.4	11.4	340.3%	7.6	2.1	253.2%
Cypress	32.0	22.0	45.8%	6.2	5.2	18.4%
Intel	833.5	585.2	42.4%	72.0	(-45.1)	NA
LSI Logic	115.0	93.3	23.3%	2.4	3.5	(-32.3%)
Texas Instruments	2,643.5	2,389.4	10.6%	145.7	(-11.5)	NA
Subtotal	**4,036.9**	**3,408.6**	**18.4%**	**234.6**	**(-92.8)**	**NA**
TOTAL	**62,311.5**	**56,599.9**	**10.1%**	**4,529.6**	**3,765.7**	**20.3%**

*HP and Cullinet for quarters ending April 30 and July 31.

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Direction Anticipated for U.S. Information Systems Budget Changes, 1986-87, in Five Major Industries, as of January 1987

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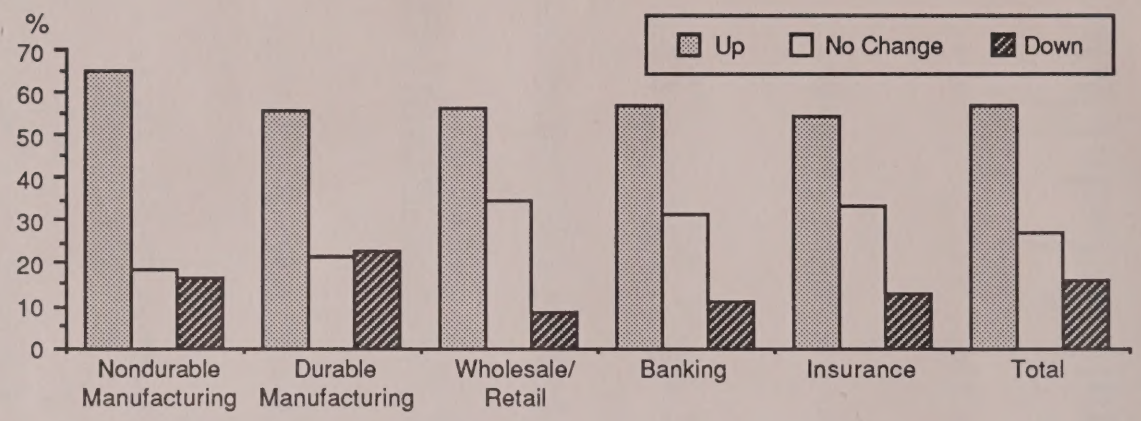

Out of the Great Softness? The User View. Since a significant proportion of the growth demonstrated by industry vendors over the first half of 1987 is a function of currency translation rather than increasing demand, the growth potential of the U.S. market remains the key to sustaining the rebound over the next couple of years. The expectations of U.S. MIS directors about what they will be spending still look more like a brake than an accelerator.

In January IDC completed a large survey of information systems (IS) managers, with 750 responses. Among the key findings were:

- Respondents anticipated IS growth for 1987 to be about 5%. Among respondents at or near the end of their fiscal year, better than half anticipated that spending would be up over 1986, a little over a quarter expected that spending would be flat, and a sizable minority (some 16%) were resigned to a lower spending level.

- Adjusted data suggested wide discrepancies in growth expectations between industries. The only industries expecting higher growth than the overall average were banking, insurance, and other financial services. The wholesale/retail sector hit the industry average on the head, while durable manufacturing, health services, education, state and local government, and other services trailed a little. The worst scenarios were presented by the transportation/utilities sector and agriculture/mining/construction (the only segment with negative growth).

IDC is currently conducting a follow-up survey of the actual respondents to see how well their expectations are being met. It is not yet complete, and the sample will necessarily be smaller than the original; however, the Gray Sheet feels that the developing trends are worth passing on, albeit with the caveat that the final results may differ in some details.

- The respondents to date were among the more optimistic of the January sample, with a projected 1987 spending growth of a little over 7%. Their hopes dampened, they now expect growth of a smidgeon over 5%.

- The percentage of respondents expecting a lower spending level than 1986 is up sharply, at around 27%, with a somewhat smaller rise in the percentage expecting a spending status quo ante (31%); the proportion anticipating spending growth is down to 42%.

Not too much should be read into these figures until IDC finishes the survey and can break out the results by industry and size of IS budget. However, they can serve as an early warning signal about the likelihood that strong U.S. market demand can sustain the rebound any time soon.

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The Manufacturing Software Market: Downsizing Applications and Expectations

In assessing the growth potential of the U.S. market, the manufacturing sector is an interesting test case. Even if expected IS growth falls below the 5% mean, it hits the 4% median; yet while the avant-garde talk of Computer Integrated Manufacturing (CIM), the vast majority have yet to take advantage of computer tools that have been available for years.

A new IDC report on manufacturing software highlights some illuminating trends. New U.S. licenses for manufacturing software (predominantly a function of new hardware shipments and the substitution of more up-to-date and functional packages) are expected to grow at an average annual rate of 19% from 1986 to 1991. However, the aggregate value of those licenses is expected to decrease at a compound annual rate of 2%.

In part this decline can be attributed to a break in the market trend line anticipated for around 1989. The three-year CAGR for the market value of new licenses is actually positive, at about 4%. What occurs at that point is the effect of downsizing on a slowly growing market, a phenomenon that becomes more obvious when the market is divided between types of hardware platforms.

- The 1986-91 average growth of new licenses projected for mainframes is flat, and of those licenses market value down about 8.5%.

- With distributed processing in the offing, the mini market would shift its center of gravity from medium-sized manufacturers to decentralized corporations. The number of new licenses would be up about 15.5% on an average annual basis through 1991, but due to changes in the pricing structure the market value CAGR of mini-based packages would decline 4%.

- Through 1991 PC-based packages would show the strongest growth, on average 28% in new licenses and nearly 40% in market value, by appealing to job shop requirements and small companies. However, in 1991 PC package revenue would still account for only 18% of a shrinking pie.

Within this downsizing environment, vendors will likely have to shave profit margins somewhat to increase the number of available modules of their flagship programs. Since MRP systems are already in place at virtually all large nonprocess industry establishments, new sales will in part be due to increased specialization for particular needs. Inexpensive modifications would also be necessary to increase penetration into the smaller nonprocessing industry companies. And modules must be added for the avant-garde that incorporate Just-In-Time (JIT) and CIM capabilities.

One likely result will be a sharp decline in the number of vendors in the manufacturing software market from today's 300 participants. As industry players focus increasingly on vertical markets, it is important to remember that some verticals will be more remunerative than others.

Value of Initial Licenses in the U.S. Manufacturing Software Market By Hardware Platform, 1986 and 1991

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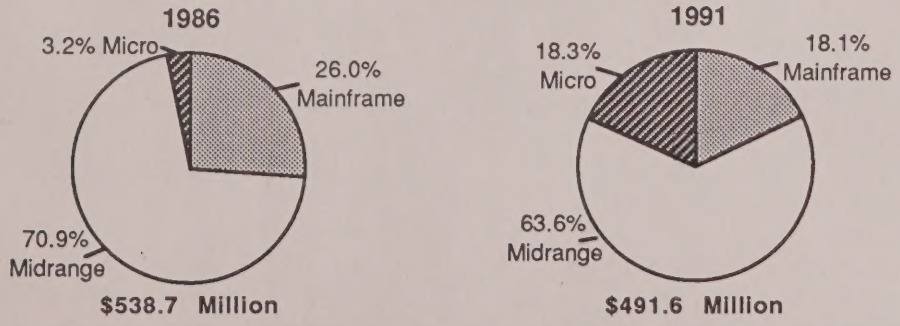

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- **ANOTHER INTEL APRON STRING UNTIED BY IBM.** An additional 5.9 million shares of Intel equity have been sold by IBM en bloc to Salomon Brothers. IBM stated that its remaining 7.8 million shares (about 7% of Intel's outstanding capital shares and equivalents) are being retained only "to support the exchange of IBM Eurobonds for Intel stock under a February 1986 offering of IBM exchangeable subordinated debentures."

- **SPORCK STORK DELIVERS FAIRCHILD.** With the Fujitsu-Fairchild relationship dead in the water, Schlumberger is selling its semiconductor division, not to a Japanese manufacturer, but to one of the most vocal foes of Japanese penetration of the U.S. market (though big mainframes are another story). National Semiconductor will purchase Fairchild for $122 million in stock and warrants.

- **NEW DG HARDWARE.** In the wake of Digital's announcement on August 3 of performance increments of up to 40% on all VAX 8000 systems and price cuts for the 8250, 8350, 8530, and (most sharply — 17-20%) the MicroVAX 2000, Data General announced two new systems in August: an enhanced MV/7800, the XP, starting at $23,000 with a reported gain of up to 40% in computation performance over the original, to match up with the VAX 8250, and a new entry-level MV/1400 DC starting under $10,000 for a reputed 1-MIPS system to compete against the MicroVAX 2000.

- **GOVERNMENT CLOSES GATE ON GOULD.** The General Services Administration has temporarily barred Gould from bidding on any government contract due to a dispute over alleged price gouging by Gould's Imaging & Graphics division.

- **HYPERCUBE^2.** Intel has announced a second-generation 80386-based version of its parallel processing hypercube system. It also noted the advent of the first commercially available software package for the system (NEKTON, a fluid dynamics and heat transfer package).

- **WESTERN DIGITAL STAKES A CLAIM IN THE COMPATIBLE MARKET.** Now that Faraday is part of the Western Digital family, the parent company is emphasizing its capability to offer a "total solution" for IBM compatibility. Its newest product is an 80286 chip set with integrated I/O on the mother board.

- **MERGER MIRAGES.** Among the few things that are nearly as common these days as industry mergers are the ones that are called off, like the proposed combination of Plexus and Arete. The two most common reasons are fuller financial information once the books of each company are completely open, and personality or outlook conflicts between the top executives who would have to work in tandem in the merged company. To the list of miscarried mergers can be added Televideo's proposed acquisition of Zentec (see last issue).

- **THE GOOD OLD DAYS.** In these times of ever-tightening controls, it is refreshing to read about Seymour Cray's early days at CDC in James C. Worthy's new *William C. Norris: Portrait of a Maverick* (Cambridge, Mass., Ballinger, 1987). Pressed by management to present a business plan, Cray finally complied, but in his own brash, brusque manner. The business plan read in its entirety, "Five-year goal: Build the biggest computer in the world. One-year goal: Achieve one-fifth of above."

- **JAPANESE TECHNOLOGY AND MICTURITION METHODOLOGY.** An interview in the August 30 Middlesex (Mass.) News suggests that the Japanese have chalked up another humbling victory over the American high-tech industry. According to Nicholas Negroponte, director of the MIT Media Laboratory, "Japanese urinals are more intelligent than American computers."

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DONALD BELLOMY, EDITOR AUGUST 19, 1987 • VOL. 23, NO. 7 PATRICK J. MCGOVERN, PUBLISHER

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Troubled Rebound in the Japanese Market: From Slump to Long-Term Softness?

"In my garden
Side by side
Native plants, foreign plants,
Growing together."
Mutsuhito, reign name Meiji, emperor of Japan (1867-1912)

Japan is the preeminent example of historical vertigo. Ulysses S. Grant had just become U.S. president when Meiji moved the capital to Tokyo, abolished feudalism, and began selectively to introduce Western culture, technology, and business methods. Today, as Meiji's grandson sits on the imperial throne, the plants from his garden, strengthened by a century of cross-pollination, have spread through the world.

But for all the horticultural skill of the government and the industrial giants, cankers have begun to appear in the garden. To combat them Japan is trying to change the mix of plants — in particular, to emphasize computers and the information industry. The strategy, however, has its risks, as computers may not prove as hearty a perennial as many have assumed. Although the computer industry in Japan showed signs in the second quarter of emerging from last year's slowdown, other signals indicate that future growth will not prove as dynamic as Japanese planners have hoped.

The Japanese information industry grew in importance as it became glaringly obvious that the industrial scaffolding of the Japanese economy, which grew to dizzying heights often at the expense of U.S. durable manufacturing, has outlived its glory days. Due to competition from other Asian countries and to the high yen's effect on exports, productivity and profitability have begun to lag at many Japanese steel mills, electronic products factories, and shipbuilding firms. Because the majority of Japanese workers are still blue collar, unemployment has jumped sharply.

Rather than play King Canute ordering the waves to retreat, the Japanese government is hoping to engineer a relatively smooth transition to a services-oriented economy. In one of those mind-boggling white papers that the Japanese government loves to emit, the Industrial Structure Council this year issued a report that projects the following scenario:

- The information industry should grow from 19.6 trillion yen ($140 billion) in 1985 to 40.4 trillion yen (nearly $290 billion) in 1990, to 144.5 billion yen ($1.3 trillion) in the year 2000. This posits a 13% compound annual growth rate 1984-1990, and a 16% CAGR 1990-1991.

- Since most projections peg growth for the Japanese GNP at around 5% p.a. for the foreseeable future, the information industry share of the Japanese GNP is projected to grow from 6.4% in 1984, to 9.6% in 1990, to 20.6% (!) in 2000.

- The scenario for 2000 envisions a Japanese computer/semiconductor industry worth $785 billion, a telecommunications sector valued at $133 billion, and information-processing services bringing in $114 billion.

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Sources and Resources

This special issue on the Japanese market is the second in a 1987 series on major international markets (the first, on the European industry, appeared in Vol. 22, No. 22, March 18, 1987). It is based primarily on reporting in the Gray Sheet's sister publication EDP Japan Report and three forthcoming reports jointly produced by IDC Japan and IDC in the U.S.: The Japanese Computer Industry Review and Forecast, 1986-1991; Japanese User Buying Intentions, 1987-1995; and Cooperative Computer Projects in Japan (Sigma, Tron, and Fifth Generation).

- Capital investment by Japanese computer-related manufacturers would grow from 9.3 trillion yen ($66.4 billion) in 1984, when it represented 11% of the national total, to 68.2 trillion yen (almost $490 billion) in 2000, when it would represent 33% of the total.

- As a result, the information industry could begin to absorb some of the excess employment from heavy industry. While 1.6 million new jobs were created by the information industry in 1984, the total for 1990 is projected at around 2.34 million, and for 2000 4.1 million.

The Industrial Structure Council report appeared in the aftermath of an uncharacteristically weak performance by Japanese vendors in FY1986, which for the large majority of companies ended on March 31, 1987. Overall, the information-systems-related revenue of the top 40 manufacturers of computers and computer-related products in Japan was up only 4.2% in FY1986. Number One Fujitsu's information systems revenue was up 4.8%; IBM Japan's fell 3.9%.

Two short-term factors have been cited as primary reasons for the slowdown. One was the climate of economic uncertainty before the Nakasone government withdrew its sales tax proposal. The other has been the rapidly appreciating yen.

The yen's strength against the dollar has adversely affected exports of computer-related products. Fujitsu's information-system revenue from export sales dropped 4.3% in FY1986, while IBM Japan's fell 8.0%. Some vendors were hurt even worse: Oki's export revenue from computer-related hardware plummeted 36.3%, and Mitsubishi's 42.8%.

The direct effect of the surging yen was nevertheless blunted in the computer industry. In the first place, losers were partially counterbalanced by winners. Despite the high valuation of the yen against the dollar, export revenue from NEC's computer-related products rose 25.5% in FY1986, and for Hitachi 37.7%.

Ironically, the big winner in export growth last year was Toshiba, where 50% export growth increased the proportion of Toshiba information systems revenue accounted for by exports from 18% to 23%. In the wake (double meanings may be read in as the reader chooses) of the Russian submarine scandal, the decline in Toshiba's exports this year could be as dramatic as last year's ascent.

In the second place, exports are less critical to the Japanese computer industry than to most other sectors of the outward-looking Japanese economy. The 22.9% share of the company's information-systems revenue that Toshiba

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PERCENTAGE OF DOMESTIC VS. EXPORT REVENUE IN FY1986 INFORMATION SYSTEM SALES FOR LEADING JAPANESE VENDORS

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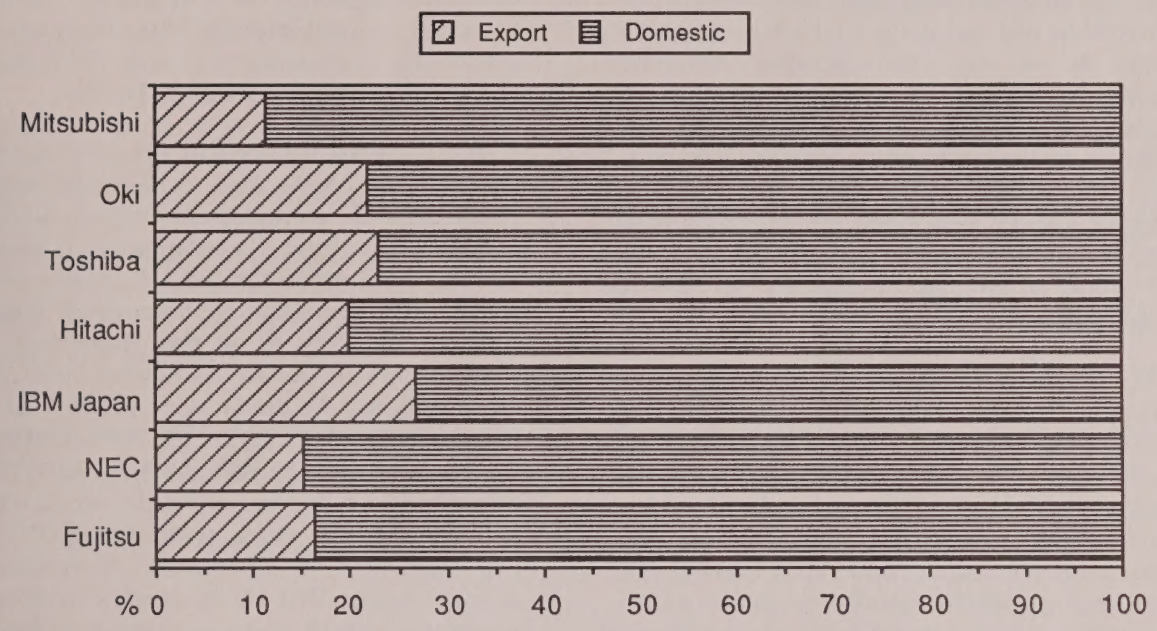

exports garnered in FY1986 was on the high side, surpassed among the Japanese Top Ten only by IBM Japan's 26.8%. Among the six purely Japanese vendors in the Top Ten (Fujitsu, NEC, Hitachi, Toshiba, Oki, and Mitsubishi), the average proportion of revenue from exports was 17.4%. This can be contrasted with the 40.5% of the value of U.S.-based vendors' shipment value that came from international shipments in 1986 (see the last issue of the Gray Sheet).

The most significant effects of the yen/dollar ratio have been indirect, through their impact on the Japanese computer industry's domestic customers. These include the major manufacturers who have been dependent on exports, and who have suffered from low profit margins on what they have been able to ship abroad. In Japan as in the U.S., the information industry usually has a measure of immunity from domestic customers' budgetary problems due to the widespread perception that companies must invest for the future even in hard times. However, it is not absolute immunity, and fiscal instability in any case induces sober second and third thoughts that stretch out the sell cycle.

In the first quarter of most vendors' FY1987 (the second of calendar 1987), there were encouraging signs of movement from users who had been postponing purchases. The turnaround has been especially strong in mainframes for the banking industry and office systems for small-to-medium-size users.

One reason was that the sales tax proposal was dead in the water, but the more important may have been that the yen seemed to have finally reached a plateau after its seemingly inexorable rise against the dollar. After rising an average of 3% in the first quarter of 1987, it rose an average of 2.5% in the second quarter. More importantly, the movement in the second half of the quarter was all downward. The yen's value against the dollar at the end of June was

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actually below what it had been at the beginning of April. This downward trend continued through July and the first days of August.

But was it after all a false dawn? For the next couple of weeks, the yen began another surge against the dollar. And there were other indices that did not bode well for a sustained boom period for the Japanese computer industry. The Japanese industry is taking steps to address the yen problem for its own exports, but other riddles could prove more intransigent.

Exports and a Yen for Overseas Production. Outside of peripherals, Japanese hardware exports come in two varieties, with contrasting market dynamics.

Personal computers still lag in the Japanese market compared to the rest of the high-tech universe, but Japanese manufacturers have focused on PCs as the type of export product from which their reputation for packaging the maximum of people-oriented technological wizardry in the minimum of space for a decent price could reap resplendent profits. Toshiba's example in 1986 suggests that this is not an impossible dream, even if its experiences in 1987 make Dulcinea look like a slatternly scullery maid again. A typical pattern is to design a personal computer for U.S. consumption and, once volume production is achieved, then consider developing a version for the home market.

The order is usually reversed for mainframes. By and large manufacturers design new systems with the Japanese user in mind, and then seek alternative channels of distribution abroad to achieve economies of scale. The PCMs (especially Amdahl and NAS) have served a critical role in this respect for Fujitsu and Hitachi, but inevitably mortgage the future of Japanese vendors to the prowess of their OEM partners' marketing and sales forces.

There are some indications of discomfort with these relationships. Hitachi for the first time is about to export mainframes to Europe under its own name, at least initially only to Japanese companies with European branches, but with the option of broader marketing once the door is open. Meanwhile Fujitsu is reportedly mulling new strategies to recover from last year's export drop. Even though Amdahl is now having strong sales, Fujitsu's profit margins are slim on the board-level components it ships to the U.S. company once the dollars are converted into yen, and its exports to Siemens have dwindled to a mere trickle. There is a possibility that, as soon as the Fujitsu/IBM software imbroglio is safely history, Fujitsu could get back into the worldwide PCM business under its own name, or at least open a new OEM channel in the U.S. for boxes as well as boards.

NEC's situation is different, in that the Gray Sheet expects that, to alleviate currency problems and forestall trade friction, NEC will choose to dissipate its economies of scale by shifting production for the U.S. market of the ACOS 1000, marketed by Honeywell Bull and Bull as the DPS 90, to the Honeywell Bull plant in Phoenix (for the background and NEC's other options, see the Gray Sheet, Vol. 22, No. 23, March 31, 1987). NEC has some maneuvering room in that the ACOS 1000/1500/DPS 90 group has been its most successful venture yet in mainframe architecture, with around 100 sales last year, half to Honeywell. Conventional wisdom holds that 50 systems a year is the minimum output necessary for economies of scale.

NEC's possible use of Honeywell Bull's Phoenix facilities raises the issue of offshore manufacturing. Three considerations are impelling Japanese computer manufacturers to shift more of their production overseas. The first is to take advantage of cheaper labor. The second is to ease trade tensions with Japan's major trade partners. The third is to avoid the penalty on exports to the U.S. due to the yen/dollar ratio. The first lures Japanese companies to other countries in Asia, while the other two make production sites in Europe and the U.S., particularly the latter, more attractive.

By the spring of 1987, major Japanese vendors had formulated the following medium-range goals and short-range plans to expand offshore production:

- Fujitsu wants to increase the percentage of its production that occurs offshore from 6% to 12% by March 1988, and to 20% by March 1989. It is continuing to expand its plant in Oregon for magnetic disk production.

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- NEC vows to produce overseas hardware accounting for 40% of total sales, and 50% of North American sales, within two to three years (the comparable figures today would be around 20% and 30% respectively). Its plant in Boxboro, Massachusetts, is being renovated for magnetic disk/ printer production scheduled to start by the end of the year.

- Hitachi wants to double the percentage of its revenue accounted for by foreign production to 10% as soon as possible, and to use overseas factories for 50% of its deliveries to non-Japanese customers. In April it began magnetic disk manufacturing in Oklahoma, where it will soon add production lines for workstations.

- Toshiba is set to virtually double its overseas production ratio to 17% in three years. After laptop exports ground to a halt in April due to the U.S. government's retaliatory tariff, it began to draw up plans for production of the T-3100/200 laptop at its Irvine, California, factory.

These measures could help alleviate some of the pressure on Japanese vendors from the yen's vertiginous climb, and could serve as a buffer in case there are further actions against imported goods from Japan. However, they are inherently defensive in nature and not likely in themselves to make a major change in the proportion of vendor revenue from non-Japanese sales.

BARRIERS TO MORE RAPID COMPUTERIZATION IN JAPAN: MIS MANAGERS' VIEWS

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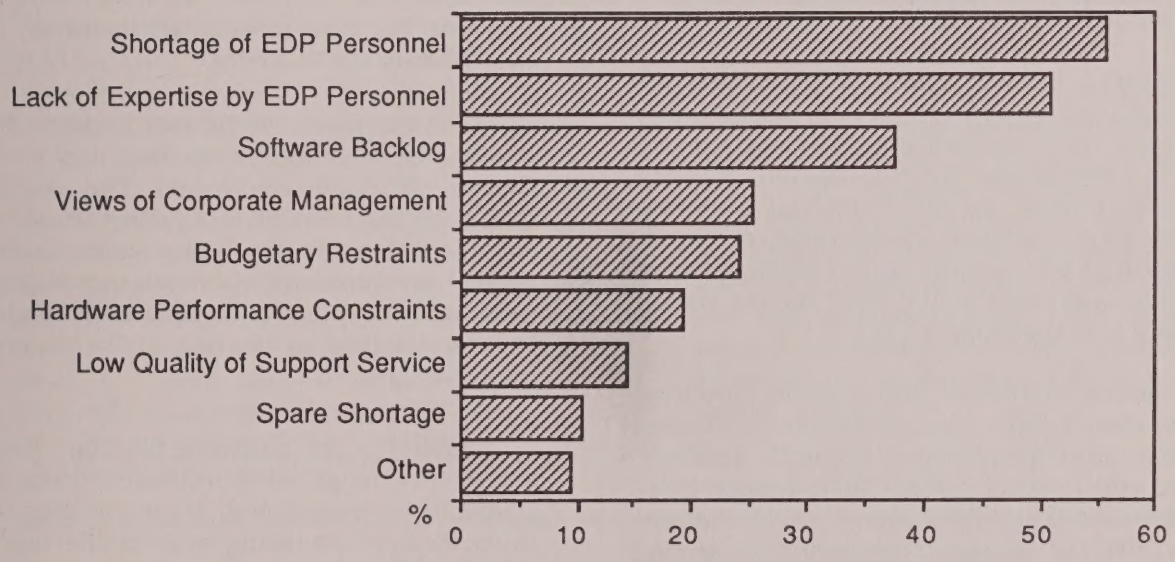

Totals do not add to 100% due to multiple responses.

The Japanese Market. Domestic sales remain the focal point of the Japanese computer industry. From this perspective, the second quarter rebound was disturbingly uneven. It is not coincidental that the areas of growth were banking and office automation, for the manufacturing and construction industries remain mired in stagnation. It is insufficient to blame their problems on the currency ratio, for the high yen can be likened to a radioactive isotope in the bloodstream of the economy, pinpointing the areas weakened by illness.

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In their heady plans for the country's computer industry, Japanese government leaders face a conundrum similar to one that has arisen in the U.S. Engineering the transition from an industrial economy based on manufacturing to a service-oriented postindustrial society is a worthy goal, but whom are the service industries then going to service? In the long run Japan may find the puzzle easier to solve than the U.S., for it can exploit physical and, to a degree, cultural contiguity in order to export services throughout the Pacific Basin. For the next decade or so, however, Japan must continue to focus on the home market.

In this regard, a survey conducted earlier this year by IDC Japan of members of the Tokyo Stock Exchange provides valuable evidence of emerging trends. Nearly 300 responses were received, with almost two-thirds from the manufacturing sector, 12% from retail, wholesale, and food outlets, 15% from transportation and construction, and 4% from banking, insurance, and securities. Three-quarters had annual DP budgets in excess of 100 million yen (some $700,000 these days), 40% were in excess of 300 million yen ($2.1 million), and 6% 2 billion yen a year or above ($14 million).

Overall, these Japanese MIS managers expected their budgets to rise about 8% a year through 1991 -- not bad, except when compared to the projections for information industry growth offered by the Industrial Structure Council even as the survey was being conducted. Growth of 8% is closer to the anticipated 5% annual expansion of the GNP for the period than it is to the report's 13%.

Among economic sectors, the banking/insurance/securities industries come the closest to the Industrial Structure Council's desideratum, with a projected 12% CAGR through 1991. The lowest expectations were held by the construction and transportation sectors, at around 6%. Manufacturing and retail/wholesale/food services were at the projected median of 8% annual growth.

When these budgets are expended, less will go for hardware. Expenses for computer hardware are expected to increase only 5% p.a.; the high-growth areas are communications (19% CAGR) and software (12%). As a result, the proportion of DP budgets allotted to hardware by respondents would drop from 37% in 1986 to 33% in 1991, the proportion to software would jump from 11% to 13%, and the slice for communications would grow from 5% to 8%.

A possible cushion for hardware vendors is the respondents' expectation that their MIPS requirements would be rising at a 17% CAGR through 1991. However, the average growth for the first half of the 1980s was in the 40-50% range, and users probably rightly assume that, with current price/performance curves, they can easily get the performance improvement they need within the 5% increase in investment that they expect to be paying.

The 12% increase in software investments actually underplays the criticality of software for the Japanese market. There continues to be a paucity of commercial packaged software, which in 1986 accounted for only 8% of respondents' software expenditures, and even after five years of steady growth is expected to reach just 16% in 1991. This reflects a traditional bias in the Japanese MIS world against standardized business approaches — as the better samurai flicks like "Yojimbo" demonstrated, the Japanese have an individualistic streak that even a Texan could admire.

Users are therefore thrown back on their own resources, which these days they are the first to admit are inadequate. The two most frequently cited obstacles to further computerization at the respondents' sites were a shortage of EDP personnel, with particular emphasis on programmers and software engineers, and the lack of expertise on the part of the personnel they did have.

Sigmafying the Software Backlog. Recognizing that the growing software backlog is a ceiling on revenue growth, Japan's leading computer vendors are taking steps to alleviate the problem. IBM Japan is showing some success, with software revenue up 40% in the first six months of 1987 over the same period last year. On the other hand, vendors know there are limits on what they can do, since the lack of software personnel and expertise affects them no less than users. Despite hiring over 1,000 new employees every year since 1983, IBM Japan expects its shortfall of software engineers to reach 4,000 by 1990. *continued on page 7*

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And it isn't alone. Last year the demand for software specialists in Japan was outstripping the supply by some 130,000 individuals, while over time the shortage is expected only to grow worse. The Industrial Structure Council estimates that there will be a shortage of over 400,000 systems engineers and programmers in Japan by the year 2000, and even that is assuming 6-8% annual productivity increments on the part of software specialists. Without that boost from improved CASE and similar tools, the shortage would be just shy of 1,000,000 software experts.

Without adequate software expertise of their own, vendors are linking up in joint ventures with users in a trend that is especially strong in the banking industry. Fujitsu's ties with subsidiary software companies affiliated with major banking and manufacturing companies have reached the double figures, while IBM Japan formed eight joint ventures last year and has added three more so far in 1987. In other words, the major vendors and the rest of the user community are piggybacking on the expertise of a handful of software developers.

Clearly this is not a long-term solution. For the long-term viability of the Japanese computer industry, then, the Japanese government-sponsored Sigma project is arguably much more critical than its Fifth Generation counterpart. Sigma is a brainchild of Japan's famous Ministry of International Trade and Industry (MITI) designed to compensate for the shortage of software experts. A dividend that has not escaped the attention of domestic vendors is that it could help create a Unix operating system standard in Japan that would be impervious to copyright infringement lawsuits by IBM.

Sigma was initiated in April 1985 and is scheduled to be completed in March 1990. The total cost is estimated at 25 billion yen (some $180 million), 13 billion of which would be government funds, 7 billion grants from the member companies, and 5 billion loans from the members. The stated goals are to leverage software development costs with common tools and information and to streamline training by standardizing on a common Unix operating system for application development (even if, as may or may not happen, the programs are then ported to run on proprietary operating systems). The principal deliverable would be Sigma-sanctioned workstations.

Phase 1, which officially finished this past spring, was the creation of prototypes for the Sigma version of Unix plus Sigma software tools, databases, and networks. Phase 2, under way now, is in-house testing of the prototypes. Phase 3, which begins in October, will involve outside testing and progressive upgrades. When validated, the Sigma workstations are supposed to be linked through a network to a central site in Tokyo where mainframes would provide a total support system for software developers.

At least, that's the goal. Some observers are wary, noting that the real fights over common specifications have yet to occur. Others are even more skeptical, charging that many participants are using Sigma simply as a temporary cover for basic R&D while they concentrate on proprietary functions and tools that will not be standardized. The question is whether the Japanese software backlog is critical enough to overcome the universal force of human nature.

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- **DIGITAL PLAYS RING AROUND THE POSIX.** With a Posix definition not due from the National Bureau of Standards until early next year, the vendors who have the most qualms about AT&T's hitherto unchallenged control of the Unix standard are pressuring the federal government to hold off large bids until it is in place. At the behest of Digital, the Air Force has agreed to suspend bidding on a $3.5 billion Unix system purchase (i.e., a contract worth nearly half the value of this year's worldwide Unix hardware shipments, according to IDC's Unix Markets and Strategies Program). Instead of announcing a successful bid next month, the Air Force will allow Digital to argue before an administrative law judge that rather than specifying compliance with AT&T's System V Interface Definition (SVID), the USAF should have articulated the level of desired functionality. Meanwhile the Army Command and Control System is reportedly dropping the SVID requirement from a $2 billion bid. The issue raised by Digital and others is whether a SVID requirement unfairly favors one vendor (AT&T) by allowing it to define the government's requirements and to derive license fees even if it does not win the contract itself.

- **GOVERNMENT LAPTOPS AT ZENITH, TOSHIBA AT NADIR.** The full-page ads taken by Toshiba in leading U.S. newspapers didn't help. The Defense Department's $104 million laptop order went to Zenith, not Toshiba.

- **A MISCELLANY OF MERGERS.** On August 19, after taking an extra week to weigh antitrust issues, the Justice Department okayed the Computer Associates acquisition of Uccel. The merger was consummated the same day. Meanwhile, in other software-related mergers, ASK has announced that it will acquire NSA and expand its manufacturing software position on Digital platforms from its heavily HP base, while Borland International is picking up Ansa (or more to the point, it is picking up Paradox as a product and Ben Rosen and Ron Posner as board members). And outside of software, Televideo and Zentec have signed a letter of intent to merge their terminal businesses. Zentec had acquired the Data Products Division of Lear Siegler last year. Televideo will use the opportunity to expand its channels of distribution into the OEM arena.

- **HP'S COMMERCIAL SPECTRUM — AT LAST.** ASK's partial apostasy in expanding into the Digital marketplace didn't prevent HP from anointing its VAR the first official recipient of a Series 930, to be delivered during the last week of August. As the approximately 100 other HP customers working with the vendor at its Software Migration Center finish the task of migrating their applications to the new 3000 architecture and operating system release, HP will gradually ramp up for volume delivery of 930s in early 1988.

- **CHANGES IN THE LINE OF SUCCESSION AT UNISYS.** Amid a series of top-level realignments at Unisys came word that Dr. Paul Stern, who had been Mike Blumenthal's right-hand man at Burroughs, has resigned as president of Unisys effective December 31. Joe Kroger, once the crown prince at Sperry, "will assist the chairman in the oversight of company affairs and help implement the Unisys marketing-based growth strategy."

- **IBM PS/2'S LEARN A LESSON.** After the dismal failure of the denatured PC jr as an alternative to the Apple II in the home and school, IBM has introduced an entry-level Model 25 to the PS/2 family for the education market and basic personal computer needs. This time it has no less functionality than the next higher IBM personal computer, the PS/2 Model 30 (e.g., the same 3.5" diskettes and the same board-level MGA capabilities).

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IBM MORTARS MORE MASONRY INTO ITS MIDRANGE STRATEGY

Digital and other IBM rivals have been sleeping well of late with the "sober certainty of waking bliss." When the Wall Street Journal places major communications news about IBM's midrange systems beneath word of a cheap Digital workstation, as it did on June 17, then it seems time to start intoning "Sic transit gloria bluie." But what's the chance that one fine morning a year or two from now people will wake from their slumber, look at IBM, and all of a sudden start talking again about the need for antitrust suits?

It's not too early to start tossing and turning. A drove of June announcements suggests how IBM intends to begin consolidating its midrange strategy, the weakest link in its product chain, and integrating it with its large-scale lines (present and future). Since we're dealing with IBM, there are as many questions as answers. But the point is, there are more and more answers.

- By finally permitting VM to exploit many of the same mainframe capabilities as MVS/XA, IBM has an operating system that allows users actually to utilize the 1-to-160 performance span of S/370 that the company has begun to emphasize in response to Digital.

- The potential role of 9370s in distributed environments was considerably enhanced by the extension of Advanced Program-to-Program Communications (APPC) services -- a.k.a. LU 6.2 protocols -- to non-CICS environments.

- Networking in a S/370 world will become much easier with a series of products that simplify the installation, modification, and management of networks and allow a wider variety of more economical configurations. In the longer term, the new products conjure up a day when systems management will merge with network management.

VM Turns XA. IBM's VM announcements on June 11 bestowed the "strategic product" crown to an operating system that was already a strategic product in many MIS shops, no matter what IBM called it. Although VM is still used primarily for application development and testing and as a migration aid, its interactive potential gave it an independent existence as well, one that IBM seemed to foster with VM offerings like PROFS.

Still, VM's deficiencies in exploiting IBM's hardware technology made some users wonder about its long-term viability. For example, while products like the VM/XA Migration Aid and VM/XA System Facility allowed customers to tap into the S/370 Extended Architecture's virtual address space and high-performance I/O subsystem for migration and testing purposes, "native" VM users were constrained within pre-XA confines (e.g., 16MB of virtual address space).

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The effect of the June 16 announcements was to unleash mainframe VM. The chief product is VM/XA System Product (SP), which allows hardware supporting XA (for currently shipping systems, Processor Groups 30 and 40) to address up to 2 gigabytes of expanded storage and 256MB of central storage. It also permits single-image processing up to the 3090-600E (previously VM could support only dyadic processors like the high-end 4381 and the 3090-200E). Native SNA support for VM/XA SP won't come until Release 2, though.

VM capabilities were also expanded with other new products. For instance, a VM/XA SP enhancement will, in conjunction with the new 3090 Multiple High Performance Guest Support, support up to four (up from one under VM/SP HPO) preferred guest operating systems, supposedly at 88-98% of native performance.

Current mainframe VM users will appreciate the vote of confidence, but the implications of the announcement run deeper. The emphasis on VM's new status as a "strategic product" is aimed at least as much at potential customers of IBM's new midrange products as at the 5% of IBM's S/370 base that IDC estimates use native VM (34% for all VM mixtures).

Talking about a consistent S/370 architecture with a 160-fold performance range is one thing. Using it is something else. Customers aren't interested in theoretical performance ranges -- they want to be able to run particular applications across a wide spectrum of systems. And the fact is, MVS is not yet supported on the lower two 9370 systems. DOS/VSE is available across the S/370 architecture, but is not the route IBM wants users to take. VM enhancements underscore the message that VM is now IBM's preferred operating system for users interested in distributing applications across a number of systems.

The VM emphasis poses some intriguing problems down the road. Mainframe VM can, now that it has received XA capabilities, function as the nexus of centralized services for distributed systems. MVS/XA would presumably still function as a production center operating system. But how different and necessary will the two roles be? Will both be required? If they are, will SAA portability links between them be sufficient, or will IBM have to provide MVS/XA products like DB2 and NetView for the VM/XA environment? These are questions to which IBM has not yet provided answers, possibly because it doesn't know either.

From Hierarchy to Equality. Like the Wall Street Journal, many industry observers shrugged when IBM followed up the VM announcements with a slew of communications products five days later. No surprises here, they yawned -- just something IBM had to do, and has done. No argument from this corner. But attention must be paid when IBM sees what has to be done, and does it.

Now that 9370s are shipping, they have to begin fulfilling their promise for distributed processing. Historically hierarchical SNA requires LU 6.2 to support the peer-to-peer communications that are essential to effective distributed processing; however, because LU 6.2 has been supported only under CICS, it has been excluded from non-CICS MVS or DOS offerings like DB2 and NetView and from all VM programs. So IBM has incorporated LU 6.2 within the VTAM communications program, which makes it accessible to 9370s running VM and, once IBM provides the hooks, to other non-CICS products as well.

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IBM S/370 OPERATING SYSTEMS INSTALLED IN THE U.S. AT YEAREND 1986
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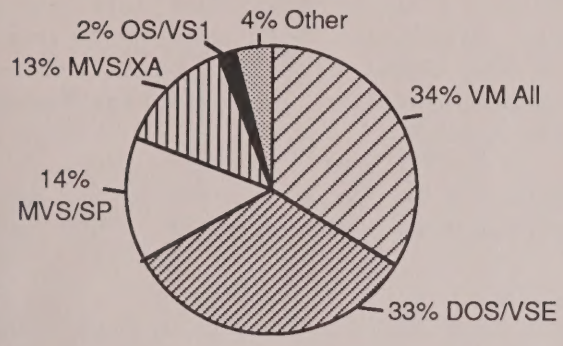

27,150 SYSTEMS

DISTRIBUTION OF VM OPERATING SYSTEMS INSTALLED IN THE U.S. AT YEAREND 1986
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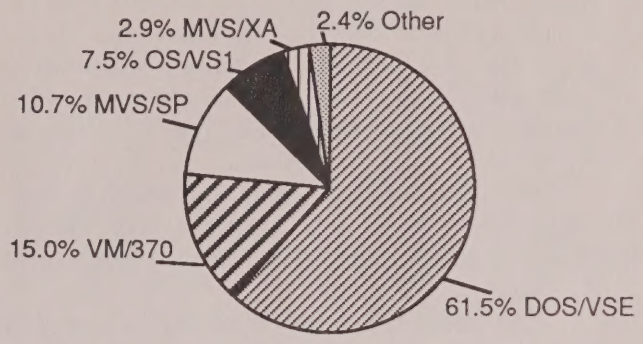

9,340 SYSTEMS

The potential to address Digital's marketing thrust is suggested by the first application to draw on VTAM's new LU 6.2/APPC capabilities, the VM-based Transparent Services Access Facility (TSAF). A program that allows up to eight VM processors to share resources transparently, TSAF can access SQL databases and (per the June 16 announcement) share PROFS calendars. More importantly for effective distributed processing, with LU 6.2 it can now operate in SNA.

From Systems to Networks. Without getting into the concrescence of new seventeen-syllable product names, suffice it to say that IBM has made it much simpler to install, define, modify, and run 9370 networks. One product, though, should be singled out, since it finally addresses a major flaw in IBM's network strategy that has made lots of dollars for Digital: ACP/VTAM Version 3 now permits modifications in the network configuration without bringing down the entire network. This capability will be critical in a distributed environment, but its absence is already a pain in the neck for SNA administrators.

One index of how serious IBM has become about networking is that it is taking active steps to bring the cost down. Several of the products announced on June 16, including a T-1 multiplexer OEMed from Network Equipment Technologies and an interface between S/370 channels and T-1 lines, are designed to increase a user's options for low-cost/high-capacity communications.

It is also worth thinking about the implications of the new release of NetView, which incorporates computer systems operations functions on the NetView operator's screen and allows NetView functions to run on an MVS system operator's console. What we seem to be seeing here is the beginnings of network and systems integration that will gradually obviate the distinctions between them. When that happens, IBM will have truly gone distributed.

IBM Has It . . . Well, in a Year or Two. In its current defensive posture, IBM has decided that it must preannounce many major new products and capabilities a year or more in advance. VM/XA SP Release 1 is due in March 1988, and Release 2 in 1Q1989. NetView Release 2 is scheduled for 1Q1988, while the APPC/LU 6.2 capabilities of VTAM Version 3, Release 2, come half a year later.

Some won't wait and will look elsewhere, maybe to Digital. But many will want to see just what the Armonkians have to offer. Under the circumstances, some sleepless nights of planning among IBM's competitors seem called for.

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WHEN YOU WISH UPON A VAR (OR, IF WISHES WERE HORSES....)

The buzzword of the second half of the 1980s has been solutions. In the same vein, most major systems vendors have tried to escape the Great Softness that first hit in 1985 by emphasizing vertical marketing. Both statements are aspects of a single phenomenon, what the Gray Sheet described back in January 1985 (Vol. 20, No. 18) as "the general perception that in a maturing industry, companies should locate specialized markets."

One question raised by this heavy emphasis by large vendors is its implications for VARs, for as the Gray Sheet also noted in January 1985, "VAR is usually shorthand for specialization."

The answers suggested by a new report from IDC's Value-Added Distribution Planning Service are only mildly optimistic for most VARs. On the one hand:

- The value of U.S. hardware shipments through the VAR channel in 1986 was $4.3 billion, or 11% of the total value of U.S. shipments. If one subtracts the value of large-scale systems, the market sector where VARs play virtually no role, the percentage becomes 14%.

- IDC projects that the U.S. VAR hardware market through 1991 should grow twice as fast as the overall systems market, at a compound annual rate of 12% vs. 6% (7% without large-scale systems).

- By 1991 the percentage of U.S. shipment value accounted for by VARs should grow from 11% to some 15% (18% without large-scale systems).

On the other hand, a number of other trends, both current and developing, scuff up some of the shine on those numbers:

- The present proportions and future growth are very uneven between market segments. Small-scale systems should continue to comprise over half of the value of all VAR hardware sales, while the percentage of medium-scale VAR hardware sales to overall medium-scale shipment value should fall from about 18% in 1986 to 12% in 1987.

- The revenue is even more uneven between VARs. IDC's VAR File indicates that nearly half have revenue under $1 million p.a., and three quarters under $3 million. VARs with revenue over $10 million a year account for only 13% of all VARs, but 78% of VAR revenue.

- Moreover, most of the growth will be absorbed by a small minority of VARs, since manufacturers are instituting policies to favor VARs that can turn over the highest volume of hardware.

- The majority of VARs will have to face not only increasing domination by the so-called "SuperVAR" distributors blessed by the major vendors, but also growing competition from the vendors themselves as they implement their own marketing campaigns in the most lucrative niches.

The bottom line seems to be that, while the specialization trend will enhance the overall U.S. VAR market over the next five years, the spoils will not be evenly spread, as consolidation becomes a major channel force.

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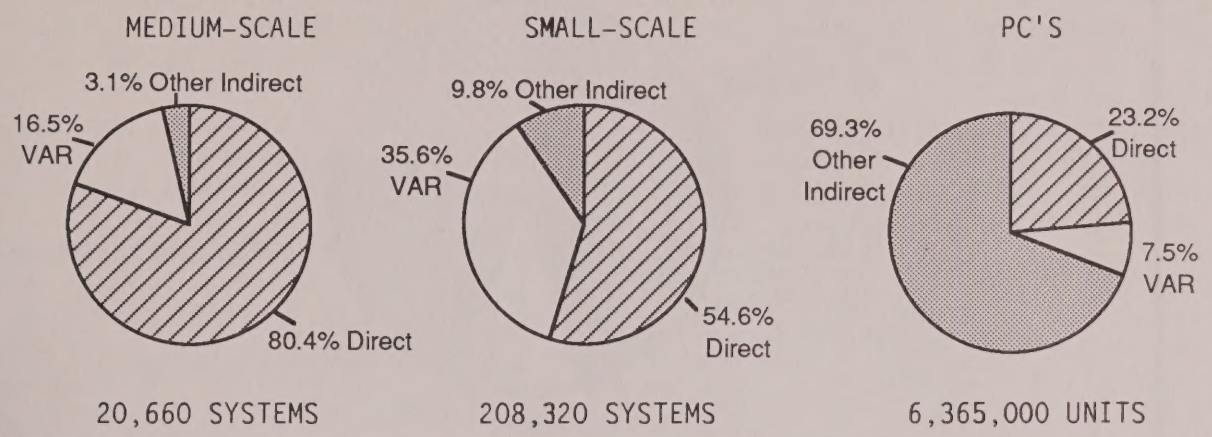

Of course, the movement isn't all in one direction. Large VARs are often critical to a hardware vendor's fortunes, both because of their ability to open new market areas on the cheap and because of their potential to maintain what is ideally a consistently high level of volume purchases. That's why it hurt so bad this month when McDonnell Douglas decided to drop Data General as a resale platform. At one point DG was the only manufacturer whose hardware McDonnell Douglas resold with its CAE and CAM software.

It's a sign of the times that the two vendors who remain in McDonnell Douglas's hangar are IBM and Digital. The industry's two top guns are not only also the leaders in VARdom, but they increased their market shares in 1986. IDC's VAR File indicates that IBM hardware is sold by 44% of U.S. VARs, and accounts for the primary processor product at 28%. Digital is represented at 20% of U.S. VARs, and at 14.5% of them it supplies the primary processor. IBM's growth is largely accounted for by ATs, and Digital's by MicroVAX IIs.

True, VARs are famous for complaining about IBM and DEC's reseller policies and attitudes, but they keep imitating Oliver Twist's grueling experience. It generally pays for a VAR to include IBM and Digital products to gain access to their reputation, their software base for applications outside of the niches served by the VARs, and for compatibility with a large user's other systems.

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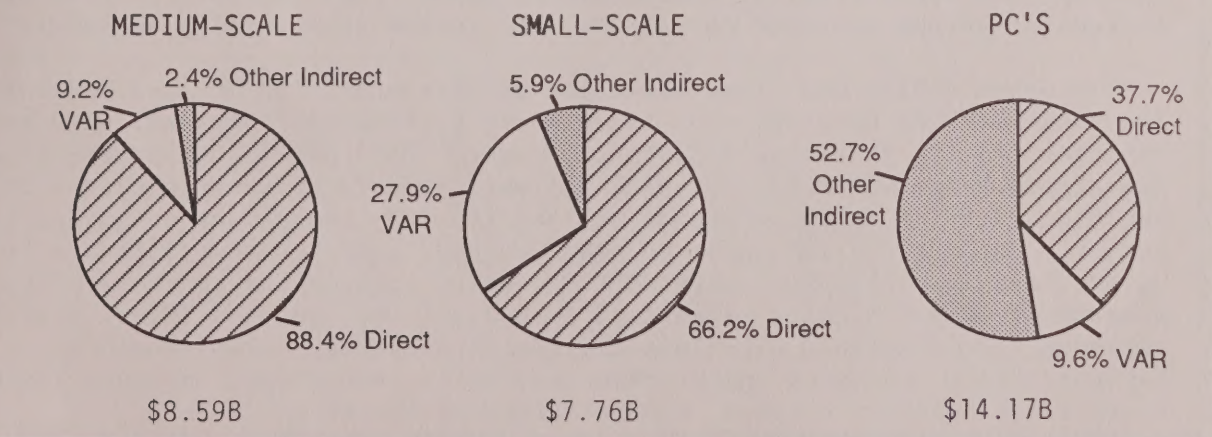

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VALUE OF 1986 U.S. VAR SHIPMENTS BY HARDWARE MANUFACTURER
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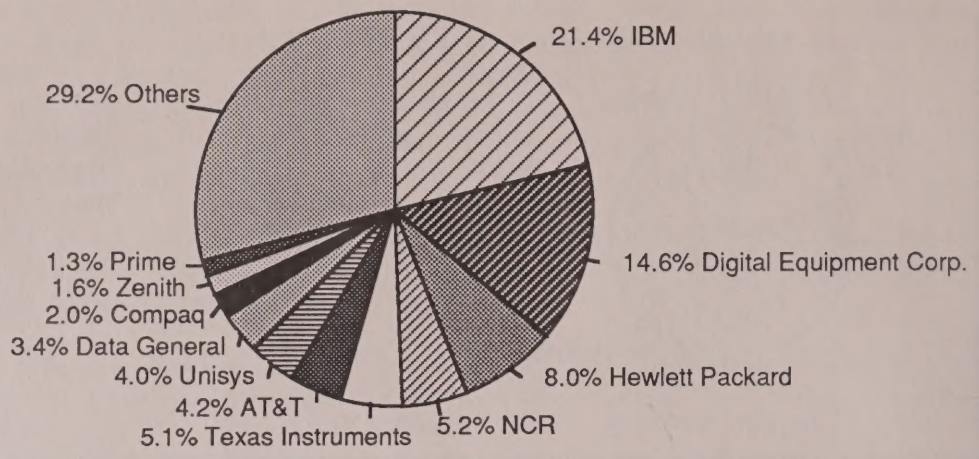

$4.363 BILLION

IBM and Digital are in their turn reacting in ways that reflect the cross-currents in vendor/VAR relations. On the surface, for example, IBM could not be more cooperative. This past February it announced new programs to bolster VAR revenue and diminish cross-channel conflicts (e.g., helping VARs install IBM hardware, and allowing them to use IBM facilities for product demonstrations).

In fact, IBM says that it plans to refer sales under $350,000 to VARs, and that it expects that by next year some 54% of individual sales in the industry will fall within that price range. Now, there's some fine print written in invisible ink beneath this promise. The vast majority of those sales will be for PCs through the retail channel, and it's up to IBM to decide what constitutes a sale under $350,000 (if the sale is for $300K worth of S/36 boxes with a possibility of $200K more in CPUs and peripherals over the next year or two, wanna bet who goes for it without so much as whispering "VAR"?). Still, IBM's promise underscores its desire to concentrate its attention on large customers, and a willingness to turn to others to pick up and share the spare change.

Nevertheless, the prospect is for more, not less, channel conflict, particularly in what are potentially the most remunerative markets for VARs and IBM. Over the past few months the number of IBM SolutionPacs, which include customization, installation, and support of IBM midrange software products, has been mushrooming. Targeted industries already include retail, education, banking, and manufacturing. Moreover, customers desiring more problem-specific customization can contract for it with IBM rather than turning to VARs.

In SolutionPacs and other marketing arrangements, IBM is also increasing its ties with the developers of third-party application software. Two primary vehicles are its Marketing Assistance Program (MAP) and Industry Marketing Assistance Program (IMAP), in which software vendors present solutions in conjunction with IBM sales personnel and receive IBM commissions on any sales that result. On June 23, IBM added another vehicle, a Cooperative Software Program under which it will offer selected third-party application programs. The program developer handles licensing, charges, terms and conditions, etc., while IBM does the marketing. The initial list of targeted markets includes manufacturing, construction, process industries, education, business training, consumer transaction systems, and certified public accountants.

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IBM is hardly alone in its efforts to corral as many vertical markets on its own as it can before turning to VARs. Thus Digital has been reducing hardware discounts to VARs, pushing resellers towards the low end of the VAX line, developing its own cooperative marketing agreements with software vendors, and training sales and marketing cadres dedicated to specific industries.

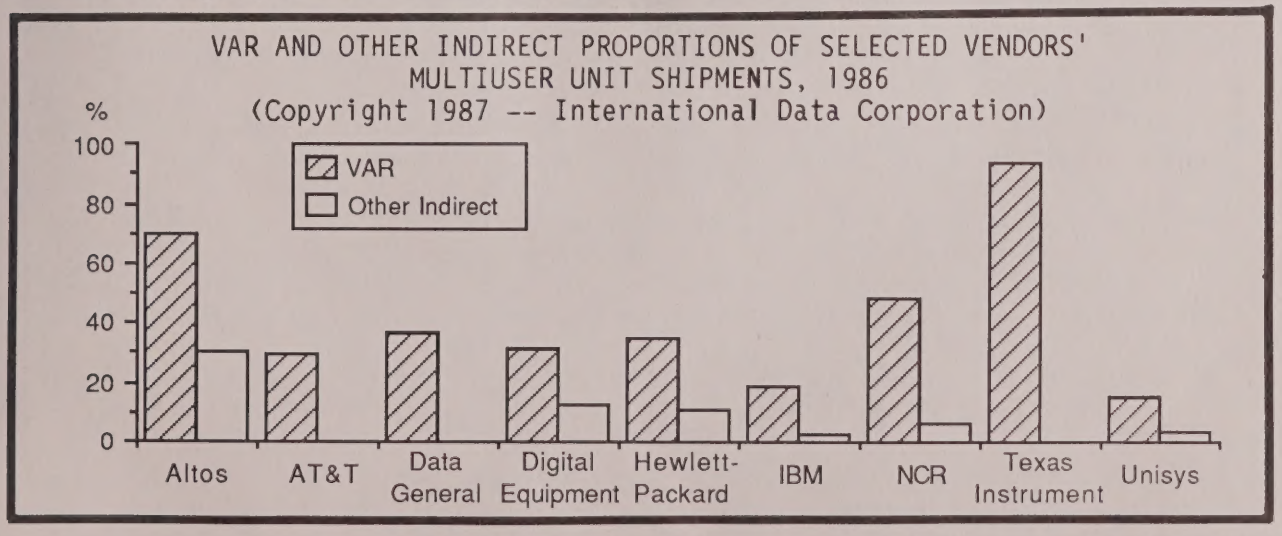
The net result is a historic reversal in the sources of Digital's hardware revenue. At the start of the decade, nearly half of Digital's U.S. revenue came through indirect sales (VARs plus OEMs), and a third from VARs. In 1986, IDC estimates that less than 30% of Digital's U.S. systems revenue was routed through indirect channels, and only 20% through VARs.

Relations between Digital and its VARs show the least strain in the small-scale (i.e., MicroVAX) market, since resellers provide a conduit to the small business market while Digital concentrates on large corporations. The situation is different, however, for medium-scale systems. Although nearly half of the U.S. VARs in the medium-scale sector of IDC's VAR File carry Digital systems, and the VAX line supplies the primary processors for a third of them, they are more and more coming into conflict with Digital's own sales force.

Due to these developments, IDC views the medium-scale VAR market as the most problematic for the rest of the decade. It is the only sector of the VAR market that is expected to lag behind overall growth in the value of U.S. shipments through 1991, with a compound annual growth rate of around 3% compared to the U.S. medium-scale market's 6% growth. Moreover, the trend is downward, with only around 1% growth projected for the 1991 time frame.

So what's a VAR to do? The largest will continue to prosper if they can continue to show hardware manufacturers a significant sales volume, and others can succeed by targeting niches too narrow for the big boys to fit into. The good news is that most VARs are small enough, with low overhead and entrepreneurial flexibility, to have a shot at survival. The bad news is that the market dynamics are such that survival may be the most that many can hope for.

If they get too deep into the densest, darkest part of the forest, they may need a MAP to get out again. VARs currently develop about two-thirds of the software they sell. In the future, many may find it more profitable to stop reselling hardware in competition with the manufacturers and instead start developing and marketing software in concert with them.



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• THE BIGGEST SOFTWARE MERGER YET. The software consolidation movement that the Gray Sheet put in fifth place among the top stories of 1986 (Vol. 22, No. 17, December 22, 1986) has in 1987 yielded the most awesome merger to date: in a stock swap worth almost $800 million, Computer Associates absorbed UCCEL on June 11. There is probably more product overlap than CA acknowledges, and it must finish assimilating UCCEL's new acquisitions, but for now CA is about twice the size of Microsoft, the second-largest independent software vendor.

• INTEL INDEPENDENCE. By announcing that it would sell back 8.9 million shares of Intel and thus reduce its equity position from 20% to 11%, IBM assuaged competitors who once feared it would exercise its option to acquire as much as 30% of the semiconductor company, and validated Intel's argument that, with the 80386 now shipping in volume, it is very much back on its feet.

• DIGITAL DOWNSHIFTS ITS TWS STRATEGY INTO HIGH GEAR. The irony in the Wall Street Journal's decision to play Digital's June 16 technical workstation announcement louder than IBM's communication news is that in this case Digital is also playing catch-up. For all the deserved hullabaloo about the MicroVAX II, Digital's VAXStation II variant shipped fewer than 4,000 units in 1986. It placed fourth in workstations, well behind Apollo, HP, and Sun.

One problem with the VAXStation II was that it was overpriced for the level of workstation functionality offered (e.g., no color). The prospect changed, though, when the MicroVAX 2000 family entered the fray. The most astonishing aspect of the June moves is that Digital, of all people, has (at least temporarily) assumed the price leadership held by Sun since it got into the business four years ago. A diskless 15" monochrome VAXStation 2000 costs $4,600, which is less than a Sun-3/50 or even a Mac II. Prices on existing diskless 19" monochrome VAXStation 2000s were halved ($10.5K to $5.4K), and an entry-level color VS2000 was introduced for $7.9K. Other announcements bolstered the position of the VAXStations, including a doubling of the nodes and the ability to support multiple "boot members" in a Local Area VAXCluster.

Aggressive low-end pricing is only the left jab setting up what Digital hopes will be a high-end haymaker. In the next few months, IDC analysts expect Digital to offer high-performance 3-D graphics workstations for a market that a year ago was the captive of just one vendor, Silicon Graphics, but that could consist of six manufacturers before the leaves turn again. And if cheap technical workstations strike some corporate users as better buys than IBM's new PS/2 line, well, Digital probably wouldn't feel too guilty about it.

• CRAY DAY FOR DIGITAL. The DEChands who bemoan the corporation's current emphasis on commercial processing rather than its traditional scientific/engineering base were beaming at the announcement of the first product Digital has developed in conjunction with another systems vendor: the VAX Supercomputer Gateway linking VAXs to Cray X-MPs. Cray gets interactive processing and a smoother interface with systems that are already often serving as front-end processors, and Digital gets what amounts to a free ride in a boom market.

• NEW AMDAHL ENTRY. In the wake of IBM's 3090-120E announcement, Amdahl has unveiled the 5390-180E detuned uniprocessor at .82 a 190E's performance.

• JUNE TUNE FOR NEW SIERRAS. IBM says that the 3090-300E and 600E will become generally available this month rather than in the third quarter.

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REVIEW & FORECAST PART II

THE GRAY SHEET
Computer Industry
REPORT

D.C.BELLOMY, EDITOR MAY 29, 1987 • VOL.23, NO.2-3 P.J.MCGOVERN, PUBLISHER

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WHILE IBM REMAINS IN ITS MIDRANGE MALAISE, DIGITAL LEADS REST OF PACK IN INTERMEDIATE SYSTEMS GROWTH

Robot on "Lost in Space" would probably have decided that this does not compute. In our Review and Forecast overview issues, the Gray Sheet has in recent years grouped medium- and small-scale systems together to portray midrange performance as a whole. However, during the second year of the Great Softness the medium-scale market seemed to be aping, even exaggerating, the weaknesses in its large-scale sibling, while small-scale sales were apparently taking growth pills from the PC market, the Baby Huey of the computer industry.

The large-/medium-scale and small-scale/PC axes were especially obvious in the U.S. market for 1986. Last year the values of both U.S. large- and medium-scale shipments were down a little over 4%. The only U.S. multiuser class to show change with a plus in front was small-scale systems, where the shipment value growth rate did not trail PCs by far (4.5% vs. 6.5%).

Moreover, the linkages can seem natural, even intuitive. After all, a number of medium-scale systems are mainframes engineered down by large-scale vendors to lock in customers (witness the Unisys A or 1100 series), while many small-scale systems are powered by the same microprocessors employed in PCs.

But in 1987 the Gray Sheet is once more combining small- and medium-scale systems for the purposes of review and forecast. Does this make any sense?

Well, yes.

- Most medium-scale systems are still generated by mini/supermini vendors with a range of midscale products that they try to position at different levels of submainframe price/performance, or by IBM, which still keeps barriers between its 43XX and 30XX lines.

- More importantly, the medium- and small-scale markets are so intertwined that each has become the pre-eminent factor in the success or failure of the other. Thus the MicroVAX II explosion occurred only because Digital's supermicro could draw on the application base developed for larger VAX systems; yet the MicroVAX II's price/performance at the 1-MIPS level was a major factor in the sharp drop in Digital's medium-scale unit shipments in 1986.

The question about medium/large and small/PC links is no straw man, since it touches on some critical market dynamics; but yes, Virginia, there really is a midrange market out there. Just ask IBM, which has been losing sales because of an inability to address its needs. Or better yet, ask Digital.

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THE IDC DATA DICTIONARY

It's been a couple of years now since the Gray Sheet has reminded readers of the definitional boundaries of the IDC classifications it employs in dividing up the computer industry. For those of you who tuned in late or could use a quick refresher:

Large-scale systems are either large general-purpose or high-speed scientific computers with average system values generally in excess of $1 million. Representative systems include IBM's 308X and 3090 series and their competitors, as well as so-called supercomputers. Systems in this category typically support over 128 users in a commercial environment.

Medium-scale systems, which include traditional supermini-class computers and some systems classified by their vendors as small mainframes, support 17 to 128 users in a typical commercial environment. They generally have average system prices ranging from $100,000 to $1 million. Representative systems include IBM's 43XX, System/38, and 9370 lines, the upper ranges of Digital's VAX series (including all 8XXX systems), and their competitors.

Small-scale systems typically support two to 16 users in a commercial environment. Systems in this class are also commonly used in automation, control, and communications processing environments. Average system values typically range from $10,000 to $100,000. Representative systems include lower-range VAX systems from Digital, System/36 models and the RT family from IBM, and multiuser microprocessor-based systems from Altos, NCR, et al.

Personal computers are typically microprocessor-based systems for single users. For microprocessor systems that can support more than one user, IDC bases the distinction between small-scale system and PC on the system's most common configuration. The category includes IBM's entire personal computer family, from the PC and PC Convertible to the PS/2, and their competitors, compatible and noncompatible, from vendors like Commodore, Apple, and Compaq; it also includes technical workstations from the likes of Apollo and Sun.

These definitions have been stable for several years, but a certain amount of shuffling between categories occurs as the competitive position of systems becomes clearer. For example, this year all S/38s were moved to medium-scale, as was the Wang VS 85, while among new products, IDC moved the RT PC to small-scale systems based on its most typical usage. These shifts are a principal reason for changes in the data in the Gray Sheet's ten-year market surveys.

The Medium-Scale Market

If your stomach can't take roller coaster rides, you don't belong in the medium-scale market. The annual variation in worldwide unit shipments by U.S.-based vendors has been bad enough -- since 1980 the yearly changes have been up 3%, up 40%, down 13%, up 50%, down 5%, down 22%. But at least as hard on the heart rate would have been the erratic growth rate for bank accounts from worldwide medium-scale shipments: up 20%, 2%, 1.5%, 35%, 8%, 1%.

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A primary reason for these gyrations is that, like the large-scale market, the medium-scale is bounded by product cycles, but more erratically, since there are two dominant medium-scale actors. Throughout the 1980s IBM and Digital have fairly consistently accounted between them for half the medium-scale shipments, half the installed base, and half the value of shipments.

Consequently new generations or product lines from either vendor have a major effect on the market as a whole, while lagging lines cause the whole sector to sag. In 1986, IBM weakness was a major factor in the medium-scale market, as was the encroachment of the MicroVAX II on what could have otherwise been VAX 8XXX sales.

The Digital example suggests a second reason for erratic movement in the medium-scale market. Both midscale segments are subject to erosion from both above and below, but in the small-scale market the problem is still more potentially than presently troublesome. In the medium-scale market, the issues are front-and-center today.

The high-end problem for all commercially oriented medium-scale vendors save one is spelled IBM mainframe. Because many sites in the target market have 30XX systems, commercial supermini vendors must give users a migration path upward within their proprietary architectures or risk losing critical application areas to Big Blue. It's not so much the high-end sales by themselves that matter -- it's their implications for a vendor's entire product line, especially with IBM now boasting about offering a 1-to-160 S/370 performance range.

There have been a flurry of announcements so far in 1987 for new high-end superminis. Prime's 6550, for instance, is touted as bringing a performance level about midway between a 3090-180E and a 200E, but for about a third the price of a 180E. Digital is one of the few vendors to specifically attack IBM's large-scale base by packaging preconfigured VAXClusters as "mainframe" equivalents, but Big Blue's big boxes are in the back of everyone's mind, both as threat and opportunity.

One side effect is that the supermini life cycle is shortening to insure that a medium-scale vendor's largest customers can be served within the proprietary architecture. Witness new 4381s from IBM, new V-models from Unisys, and so on.

IBM VS. DIGITAL IN THE WORLDWIDE MIDRANGE (MEDIUM- AND SMALL-SCALE) MARKETS, 1982-1986
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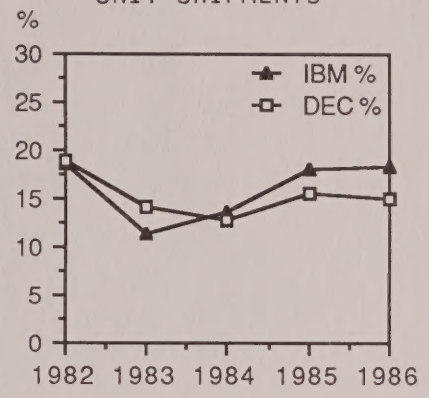
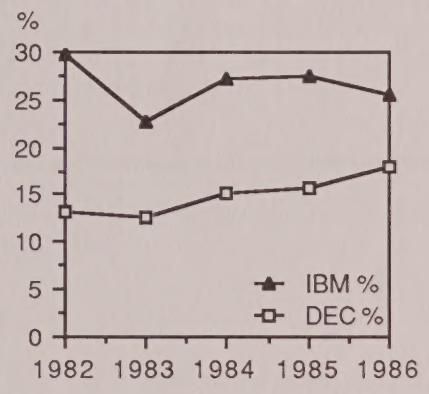
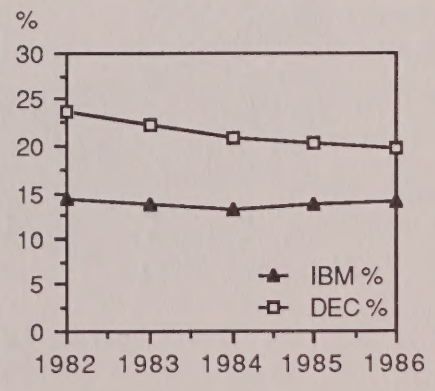
UNIT SHIPMENTS



SHIPMENT VALUE



INSTALLED BASE



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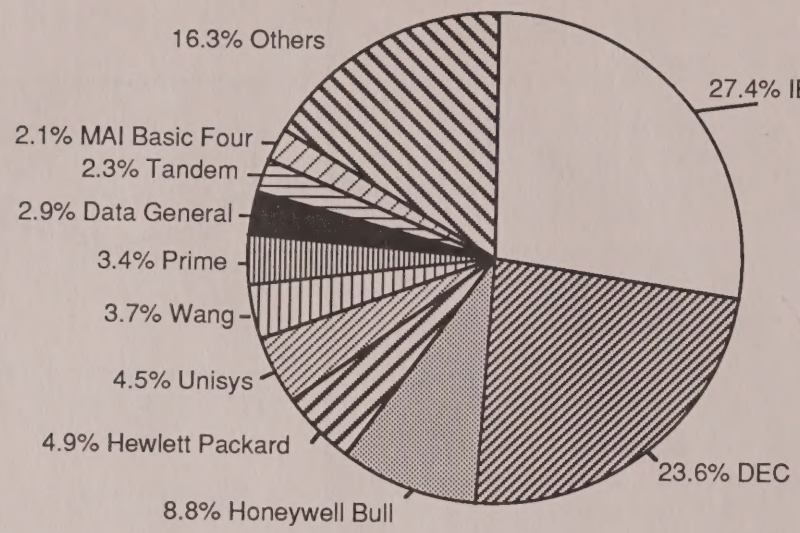
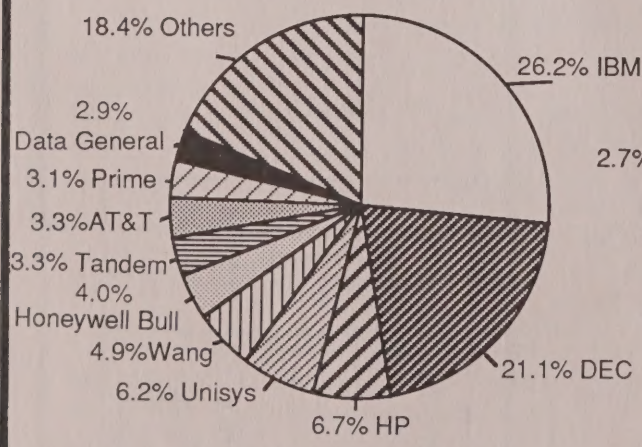
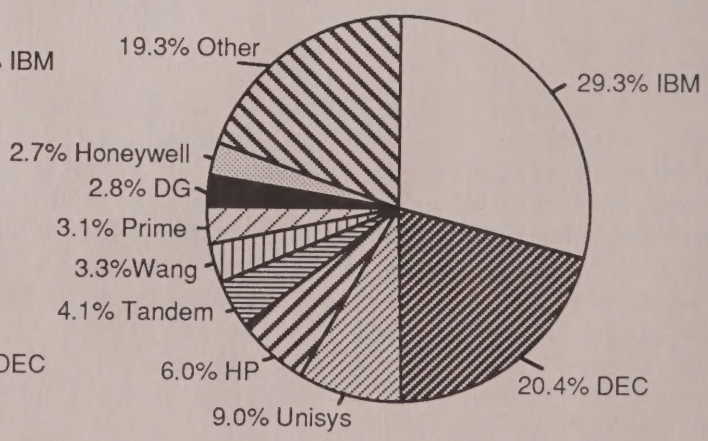
WORLDWIDE MARKET SHARES OF U.S.-BASED VENDORS' INSTALLED BASE (UNITS)
OF MEDIUM-SCALE SYSTEMS, 1/1/1987
(Copyright 1987 -- International Data Corporation)



235,160 Systems

1986 WORLDWIDE MARKET SHARES OF MEDIUM-SCALE SHIPMENTS BY U.S.-BASED VENDORS
UNITS (LEFT) AND DOLLAR VALUE (RIGHT)





33,260 Systems

$15.02 Billion

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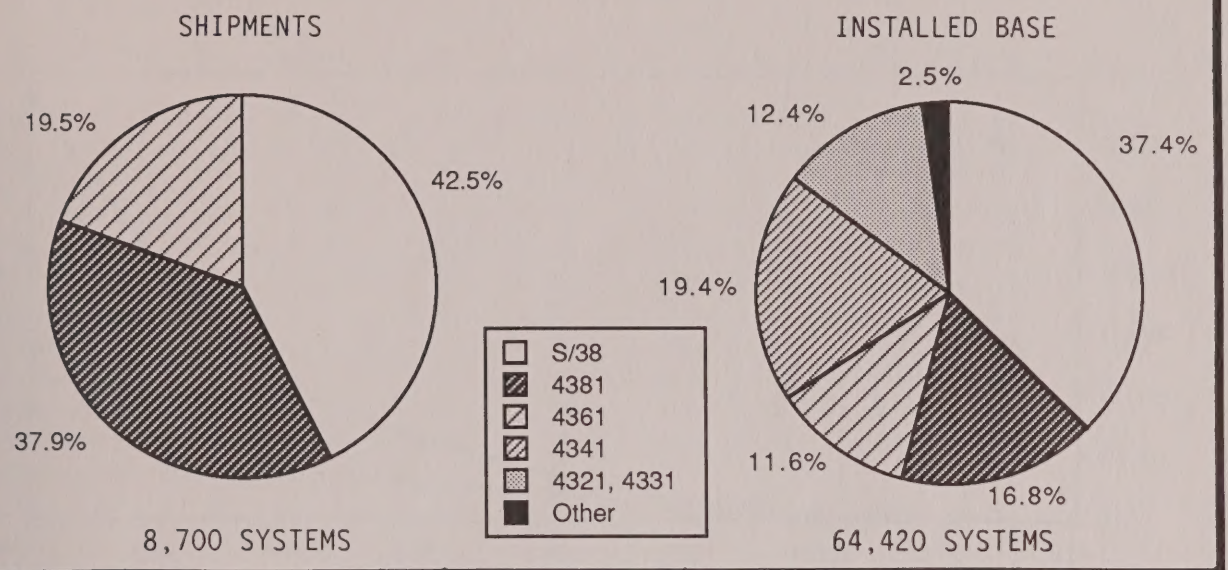
IBM'S WORLDWIDE MEDIUM-SCALE SHIPMENTS AND INSTALLED BASE BY FAMILY, 1986
(Copyright 1987 -- International Data Corporation)



An even more critical front in the supermini wars, though, is the low end. An insurance policy against losing applications to IBM mainframes isn't worth very much if you haven't gotten the applications in the first place, which is what normally happens at the low-end medium-scale or, increasingly, the small-scale level of a midrange vendor's product line.

Theoretically it shouldn't make any difference where users come in, as long as they do; but fiscally it does matter. The meeting point where reasonably high volume and profit margins can intersect is in the low end of the medium-scale market rather than the necessarily rather inexpensive microprocessor-based small-scale, or the low-demand high-end superminis.

So at least Digital seems to be reasoning with the new products and pricing that it announced in March (see the Gray Sheet, Vol. 22, No. 22, March 18, 1987). So at least IBM has come to realize with the 9370s.

These, then, are the parameters within which the medium-scale market has been moving. The resulting directions IDC and the Gray Sheet read as follows:

- In 1986, 32,260 medium-scale systems were shipped worldwide by U.S.-based vendors, 22% fewer than were shipped in 1985. This drop was roughly proportionate in the U.S. and in international shipments.

- Because a higher proportion were bigger, costlier systems, the shipment value gap wasn't so wide. The 4% drop in U.S. shipment value was partly offset by the 9.5% growth from currency conversion for international shipments, for 1% worldwide growth to $15.05 billion.

- The value of medium-scale shipments has been growing faster than the volume. The 1981-86 compound annual growth rate for unit shipments was 6%, and for the value of shipments 9%.

- This proportion should be reversed for CAGRs in the 1986-91 time frame (9% growth in units, 7% in the value of shipments).

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DIGITAL VAX 780-EQUIVALENTS* SHIPPED AND INSTALLED, 1978-1986
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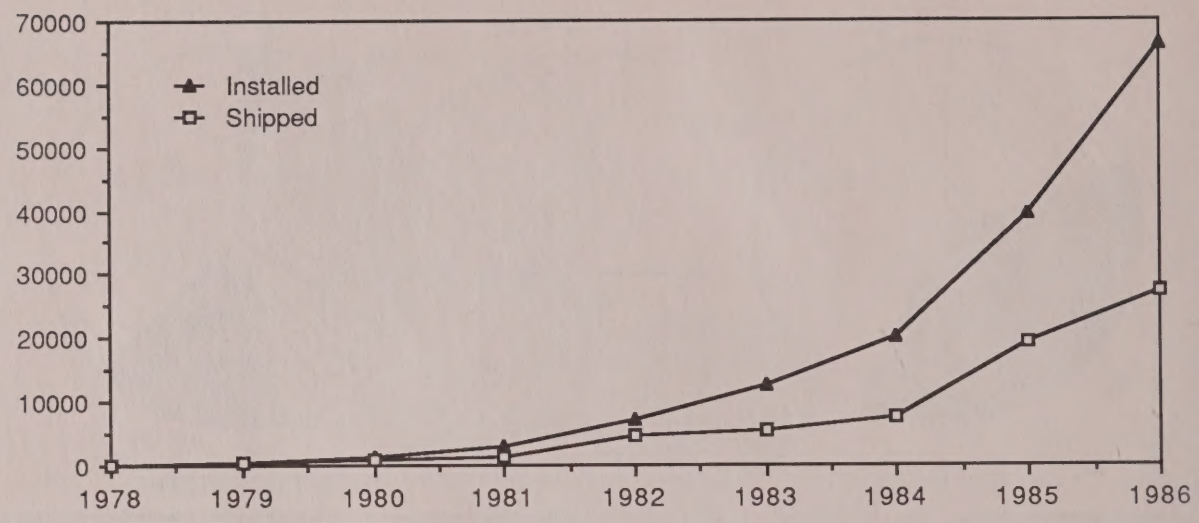

*Digital VAX shipments and installed base by model times Digital-supplied performance relative to the 780. The 780 is popularly rated at 1.0 MIPS.

That is, the numbers quantify the trends described in the prose. With vendors like IBM and Digital re-emphasizing the lower half of their medium-scale offerings with new systems like the 9370s and the VAX 8250, 8350, and 8530, overall medium-scale price/performance will become more attractive to users, as vendors get positioned to avoid being swamped by small-scale price/performance.

Who's on First. The revised medium-scale strategies of the two traditional leaders in the segment are partially explicated by their 1986 results. IDC's estimate of $4.4 billion in worldwide medium-scale revenue for IBM represents a 7% drop from 1985's $4.74 billion, which was in its turn only a 6.5% rise from 1984. Even more significantly for its long-term implications, IBM's share of the worldwide medium-scale installed base has been dropping each year of this decade, from 39% in 1981 to 27% in 1986.

Digital's problem isn't slippage but stasis. Its $3.06 billion in worldwide medium-scale revenue in 1986 represented a 7% rise as opposed to IBM's 7% fall, but a 7% jump on top of 1985's 9% growth rate is less than stellar for a company on the sunny side of a major product transition (Digital's medium-scale growth was higher during the dog days of the early 1980s). Now, the Gray Sheet obviously isn't saying that Digital is worse off than it was in 1982-83; but, as we've mentioned before, too much of that growth for comfort has been due to the MicroVAX II (see also the Gray Sheet, Vol. 22, No. 21, March 10, 1987).

Three major vendors registered strong medium-scale systems growth (i.e., in the 20% or above range for the value of worldwide shipments) in 1986. Tandem continues to reap the benefits of an architecture customized for OLTP, Wang had a strong year for VS 100s and 300s, and Burroughs, with a range of V-series and new entry-level A-series systems, regained much of the momentum it had lost in 1985. Sperry weakness, though, kept Unisys growth at 5.5%.

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WORLDWIDE VALUE OF U.S.-BASED VENDORS' MEDIUM-SCALE SHIPMENTS, 1982-1986
(Copyright 1987 -- International Data Corporation)

	1982		1983		1984		1985		1986	
	$M	% Mkt	$M	% Mkt	$M	% Mkt	$M	% Mkt	$M	% Mkt
IBM	4,350	43.3%	2,960	29.0%	4,450	32.3%	4,740	31.9%	4,400	29.3%
Digital	1,100	10.9%	1,380	13.5%	2,630	19.1%	2,860	19.2%	3,060	20.4%
Unisys										
Burroughs	240	2.4%	420	4.1%	730	5.3%	690	4.6%	900	6.0%
Sperry	580	5.8%	540	5.3%	300	2.2%	590	4.0%	450	3.0%
HP	370	3.7%	650	6.4%	850	6.2%	890	6.0%	900	6.0%
Tandem	270	2.7%	360	3.5%	450	3.3%	520	3.5%	620	4.1%
Wang	240	2.4%	180	1.8%	290	2.1%	400	2.7%	500	3.3%
Prime	300	3.0%	290	2.8%	360	2.6%	450	3.0%	470	3.1%
Data General	190	1.9%	440	4.3%	410	3.0%	430	2.9%	420	2.8%
Honeywell	530	5.3%	570	5.6%	450	3.3%	410	2.8%	400	2.7%
Other, Third-Party Per.	1,880	18.7%	2,410	23.6%	2,840	20.6%	2,890	19.4%	2,900	19.3%
Total	10,050		10,200		13,760		14,870		15,020	

Despite a new crew of products on deck, Data General slipped a little in the value of its medium-scale shipments and its market share in 1986. The other major vendors to slip in 1986 besides IBM and DG were all in the Bunch, which makes Burroughs' growth not only lucrative, but exceptional.

Prime's growth of over 4% wasn't spectacular, but should be improved upon in 1987 with the company's new systems. The other vendor that can expect a stronger 1987 is Hewlett-Packard, as its first two commercial 3000 series Precision Architecture systems ship and its 9000 series offerings expand. Meanwhile a number of start-ups are showing strong growth, but not enough to allow the 44 "Other" vendors to grow faster than the segment's Top Ten.

VALUE OF U.S. MEDIUM-SCALE SHIPMENTS, 1982-1986
(Copyright 1987 -- International Data Corporation)

	1982		1983		1984		1985		1986	
	$M	% Mkt	$M	% Mkt	$M	% Mkt	$M	% Mkt	$M	% Mkt
IBM	2,570	42.1%	1,500	24.6%	2,540	29.7%	2,515	28.0%	2,100	24.4%
Digital	670	11.0%	830	13.6%	1,560	18.2%	1,730	19.3%	1,780	20.7%
Unisys										
Burroughs	170	2.8%	250	4.1%	440	5.1%	410	4.6%	540	6.3%
Sperry	290	4.8%	270	4.4%	170	2.0%	300	3.3%	220	2.6%
HP	200	3.3%	370	6.1%	480	5.6%	400	4.5%	400	4.7%
Tandem	180	3.0%	250	4.1%	300	3.5%	340	3.8%	370	4.3%
Wang	150	2.5%	110	1.8%	170	2.0%	245	2.7%	270	3.1%
Prime	190	3.1%	160	2.6%	210	2.5%	240	2.7%	250	2.9%
Data General	130	2.1%	290	4.8%	280	3.3%	280	3.1%	260	3.0%
Honeywell	240	3.9%	280	4.6%	240	2.8%	240	2.7%	220	2.6%
Other, Third-Party Per.	1,310	21.5%	1,790	29.3%	2,160	25.3%	2,270	25.3%	2,180	25.4%
Total	6,100		6,100		8,550		8,970		8,590	

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MEDIUM-SCALE COMPUTER MARKET -- U.S.-BASED MANUFACTURERS
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	Number of Systems Shipped	Cumulative Number in Use	$ Million Value Shipped	$ Billion Value in Use
		WORLDWIDE		
1981	24,740	87,040	9,860	38.9
1982	34,610	116,130	10,050	45.1
1983	29,960	140,580	10,200	49.7
1984	45,120	177,660	13,760	57.9
1985	42,730	210,300	14,870	66.2
1986	33,260	235,160	15,020	73.7
1987	38,000	264,200	16,350	81.8
1988	44,200	297,900	17,620	90.7
1989	45,900	332,900	18,700	99.7
1990	45,500	367,100	19,880	109.5
1991	51,000	406,200	21,200	119.9
		UNITED STATES		
1981	14,140	49,270	6,200	21.1
1982	19,440	65,880	6,100	24.5
1983	18,010	80,880	6,100	28.2
1984	27,460	104,150	8,550	33.3
1985	26,810	124,970	8,970	38.1
1986	20,660	141,020	8,590	42.4
1987	24,000	159,500	9,200	47.0
1988	27,000	180,300	9,900	52.0
1989	27,000	201,100	10,400	57.2
1990	26,000	221,100	11,000	62.7
1991	30,000	244,500	11,700	68.5
		INTERNATIONAL		
1981	10,600	37,770	3,660	17.8
1982	15,170	50,250	3,950	20.6
1983	11,950	59,700	4,100	21.5
1984	17,660	73,510	5,210	24.6
1985	15,920	85,330	5,900	28.1
1986	12,600	94,140	6,430	31.3
1987	14,000	104,700	7,150	34.8
1988	17,200	117,600	7,720	38.7
1989	18,900	131,800	8,300	42.5
1990	19,500	146,000	8,880	46.8
1991	21,000	161,700	9,500	51.4

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SMALL-SCALE COMPUTER MARKET -- U.S.-BASED MANUFACTURERS
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	Number of Systems Shipped	Cumulative Number in Use	$ Million Value Shipped	$ Billion Value in Use
		WORLDWIDE		
1981	188,210	983,840	8,100	40.8
1982	256,630	1,214,570	8,150	49.2
1983	266,090	1,451,300	9,130	56.9
1984	349,560	1,754,770	10,740	65.9
1985	322,470	2,021,690	12,060	74.8
1986	329,200	2,289,980	12,930	85.1
1987	345,810	2,575,510	13,910	95.7
1988	385,150	2,890,575	15,090	107.2
1989	424,400	3,232,850	16,220	119.1
1990	471,550	3,594,890	17,350	131.4
1991	519,240	3,983,860	18,540	145.1
		UNITED STATES		
1981	110,800	632,500	4,900	23.9
1982	161,240	775,660	5,170	29.4
1983	173,320	928,880	5,690	34.4
1984	242,220	1,139,910	6,670	40.6
1985	210,970	1,315,900	7,425	46.5
1986	208,320	1,488,770	7,760	53.0
1987	217,660	1,664,240	8,230	59.5
1988	242,390	1,861,875	8,890	66.6
1989	267,130	2,074,360	9,510	73.7
1990	296,810	2,295,710	10,130	80.8
1991	326,490	2,539,190	10,740	89.0
		INTERNATIONAL		
1981	77,410	351,340	3,200	16.9
1982	95,390	438,910	2,980	19.8
1983	92,770	522,420	3,440	22.5
1984	107,340	614,860	4,070	25.3
1985	111,500	705,790	4,635	28.3
1986	120,880	801,210	5,170	32.1
1987	128,150	911,270	5,680	36.2
1988	142,760	1,028,700	6,200	40.6
1989	157,270	1,158,490	6,710	45.4
1990	174,740	1,299,180	7,220	50.6
1991	192,750	1,444,670	7,800	56.1

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The Small-Scale Systems Market

Let's get the basic market data out of the way as soon as possible. The shipment of 329,200 small-scale systems worldwide (by U.S.-based vendors, as is the case throughout) in 1986 meant a 2% rise over 1985. The installed base was just a hair under 2,290,000 by January 1, 1987. The value of shipments rose 7% worldwide because for once the U.S. market was up in 1986.

The raw data, though, are less telling than the underlying market dynamics:

- Despite the accelerating shift to microprocessor-based small-scale systems, for the second straight year, the average system value of new shipments in the sector increased rather than decreased.

- In the multiuser segment where start-ups have traditionally had their best shot, for the second straight year, the market share held by the roughly 200 vendors not in the Top Ten declined.

Both anomalies can by wholly or partially ascribed to the resurgence of proprietary architectures. It's still true that no one dominates the small-scale market. Between them IBM and Digital accounted for 36% of the worldwide value of 1986 small-scale shipments, 34% of unit shipments, and 32% of the installed base. But between them, IBM's S/36 and Digital's MicroVAX II were rewriting, at least temporarily, the trend lines for the market sector.

It may be more than just a proprietary resurgence -- it could also be a turn to established, well-known vendors by major corporations as they gradually implement communications and processing plans for their departments and dispersed offices. The second strongest growth among major small-scale vendors in 1986 was registered by NCR, which suggests that when the corporate world thought Unix supermicro last year, it tended to think of NCR's Tower series.

Even so, the growth in the value of NCR small-scale shipments, just a little shy of 22%, paled beside the 40% expansion tallied by Digital on the strength of 25,000 MicroVAX II systems (not counting VAXStation shipments, which IDC counts in the PC sector). Standing on the shoulders of its little giant, Digital managed to increase its share of the small-scale market from 11.5% in 1985 to over 15%, its best showing since 1982.

The lesson has not been lost on Digital's competitors, who are flocking to develop their own microprocessor-based small-scale systems. However, it must be said that just having a proprietary supermicro is no guarantee of success in the sector, as Data General has learned with the MV/2000. The overall midrange product line has to be strong enough to make users want a small, relatively inexpensive system that can run the same software.

With both Digital's and NCR's successes in mind, several vendors are hedging their bets by offering both proprietary and commodity-chip Unix solutions. It remains to be seen whether companies like Tandem or Prime will stick with small-scale Unix entry points if they appeal to a wider audience than new accounts and VARs and begin to swipe sales from the vendors' proprietary small-scale systems. Meanwhile a few major vendors are experimenting with Unix on proprietary RISC chips that potentially can run faster than Intel or Motorola microprocessors. IBM's RT has been a disappointment, but HP has high hopes for the 8XX models in its Precision Architecture 9000 series.

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WORLDWIDE MARKET SHARES OF U.S.-BASED VENDORS' INSTALLED BASE (UNITS)
OF SMALL-SCALE SYSTEMS, 1/1/1987
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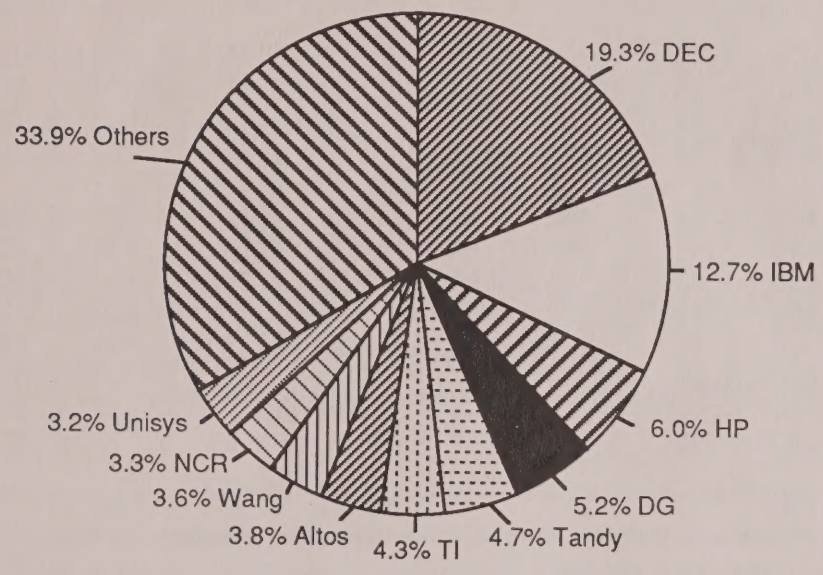
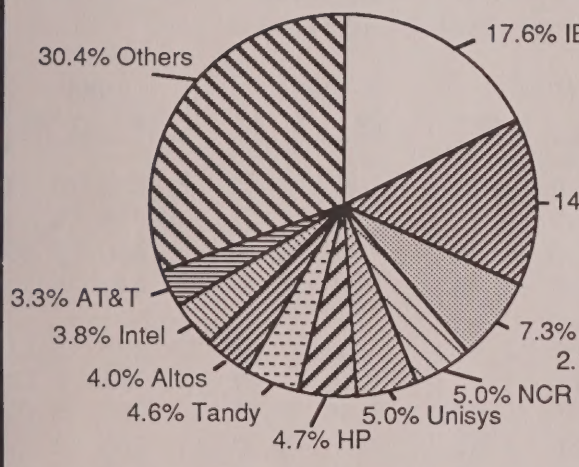
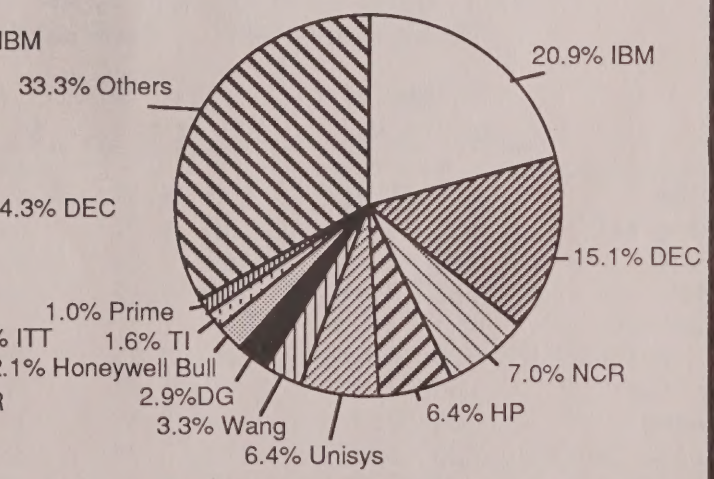


2,289,980 Systems

1986 WORLDWIDE MARKET SHARES OF MEDIUM-SCALE SHIPMENTS BY U.S.-BASED VENDORS
UNITS (LEFT) AND DOLLAR VALUE (RIGHT)





329,200 Systems

$12.93 Billion

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WORLDWIDE VALUE OF U.S.-BASED VENDORS' SMALL-SCALE SHIPMENTS, 1982-1986
(Copyright 1987 -- International Data Corporation)

	1982		1983		1984		1985		1986	
	$M	% Mkt	$M	% Mkt	$M	% Mkt	$M	% Mkt	$M	% Mkt
IBM	1,070	13.1%	1,410	15.4%	2,220	20.7%	2,700	22.4%	2,700	20.9%
Digital	1,290	15.8%	1,040	11.4%	1,090	10.1%	1,390	11.5%	1,950	15.1%
NCR	320	3.9%	330	3.6%	580	5.4%	740	6.1%	900	7.0%
HP	630	7.7%	740	8.1%	720	6.7%	780	6.5%	830	6.4%
Unisys										
Burroughs	470	5.8%	430	4.7%	500	4.7%	590	4.9%	630	4.9%
Sperry	120	1.5%	140	1.5%	230	2.1%	230	1.9%	200	1.5%
Wang	280	3.4%	360	3.9%	250	2.3%	380	3.2%	430	3.3%
Data General	300	3.7%	280	3.1%	420	3.9%	390	3.2%	370	2.9%
Honeywell	60	0.7%	120	1.3%	190	1.8%	230	1.9%	270	2.1%
Texas Instr.	470	5.8%	310	3.4%	300	2.8%	250	2.1%	210	1.6%
Prime	50	0.6%	100	1.1%	120	1.1%	110	0.9%	130	1.0%
Other	3,090	37.9%	3,870	42.4%	4,120	38.4%	4,270	35.4%	4,310	33.3%
Total	8,150		9,130		10,740		12,060		12,930	

In 1986, proprietary architectures accounted for nearly half of the small-scale systems shipped worldwide (49% -- 43% in the U.S., 59% internationally). This figure doesn't approach the 70% share of unit shipments that proprietary architectures held in 1982, but it's up from the 46% share in 1984.

The second-place finisher last year was a newcomer. Intel 80X8X chips garnered over a quarter of the small-scale market in 1986, up from 11% in 1984 and just 3% in 1982. Despite NCR, Motorola's 68000 family slipped to third place at 16%, down from 24% in 1984. The share of systems running Z80/Z8000 chips fell off sharply, from 9% in 1984 to 1% in 1986. The number based on WE32000 chips quadrupled, but still accounted for only 4% of shipments.

VALUE OF U.S. SMALL-SCALE SHIPMENTS, 1982-1986
(Copyright 1987 -- International Data Corporation)

	1982		1983		1984		1985		1986	
	$M	% Mkt	$M	% Mkt	$M	% Mkt	$M	% Mkt	$M	% Mkt
IBM	600	11.6%	870	15.3%	1,420	21.3%	1,640	22.1%	1,500	19.3%
Digital	820	15.9%	550	9.7%	640	9.6%	880	11.9%	1,235	15.9%
NCR	110	2.1%	140	2.5%	290	4.3%	380	5.1%	460	5.9%
HP	380	7.4%	450	7.9%	400	6.0%	410	5.5%	440	5.7%
Unisys										
Burroughs	220	4.3%	240	4.2%	160	2.4%	260	3.5%	280	3.6%
Sperry	60	1.2%	90	1.6%	100	1.5%	110	1.5%	95	1.2%
Wang	150	2.9%	200	3.5%	130	1.9%	195	2.6%	230	3.0%
Data General	220	4.3%	190	3.3%	320	4.8%	300	4.0%	285	3.7%
Honeywell	10	0.2%	40	0.7%	90	1.3%	120	1.6%	140	1.8%
Texas Instr.	280	5.4%	200	3.5%	200	3.0%	170	2.3%	145	1.9%
Prime	30	0.6%	80	1.4%	80	1.2%	70	0.9%	80	1.0%
Other	2,290	44.3%	2,640	46.4%	2,840	42.6%	2,890	38.9%	2,870	37.0%
Total	5,170		5,690		6,670		7,425		7,760	

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PROPORTION OF PROPRIETARY VS. COMMERCIAL CHIPS IN WORLDWIDE SMALL-SCALE SYSTEM SHIPMENTS, 1982-1986
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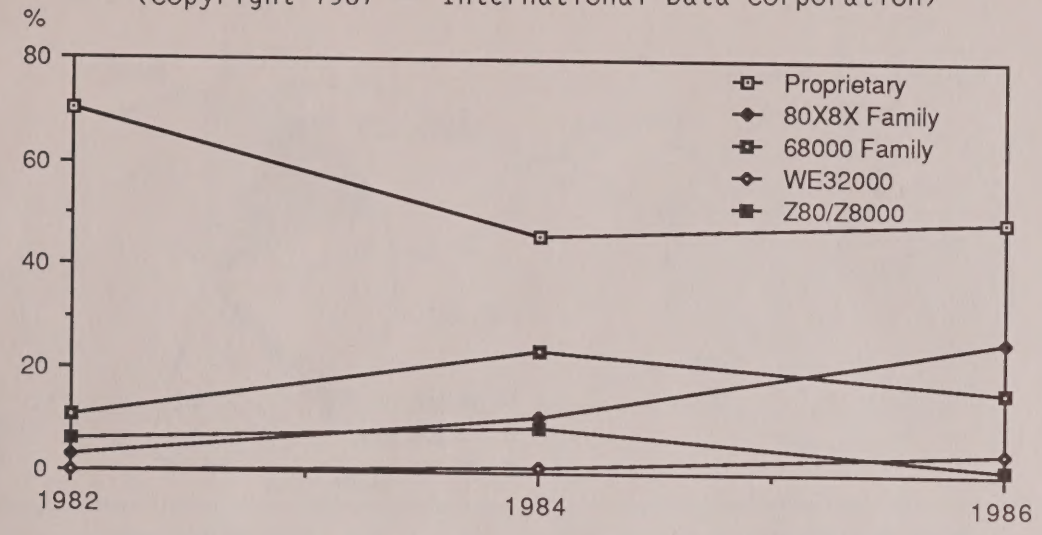

Incompatibility: Both Digital and IBM "Have It Now." The MicroVAX II is certainly the single most successful multiuser system introduced in the past two years. That said, one little fact should be remembered amid all the PR about Digital's "single-architecture" strategy: nearly half of Digital's small-scale shipments in 1986 were PDP-11s. Moreover, 90% of Digital's small-scale installed base has a PDP written in front of it. Looking at Digital's midrange offerings as a whole, we find only 20% of the installed base capable of running VMS (VAX 11/7XX, 8XXX, and MicroVAX II systems).

And the small-scale system shipping in the highest volume worldwide in 1986 wasn't the MicroVAX II. It was still IBM's much-maligned S/36, which accounted for the near doubling in IBM's small-scale shipment value from 1983 to 1986.

1986 DIGITAL SMALL-SCALE SHIPMENTS AND INSTALLED BASE BY FAMILY
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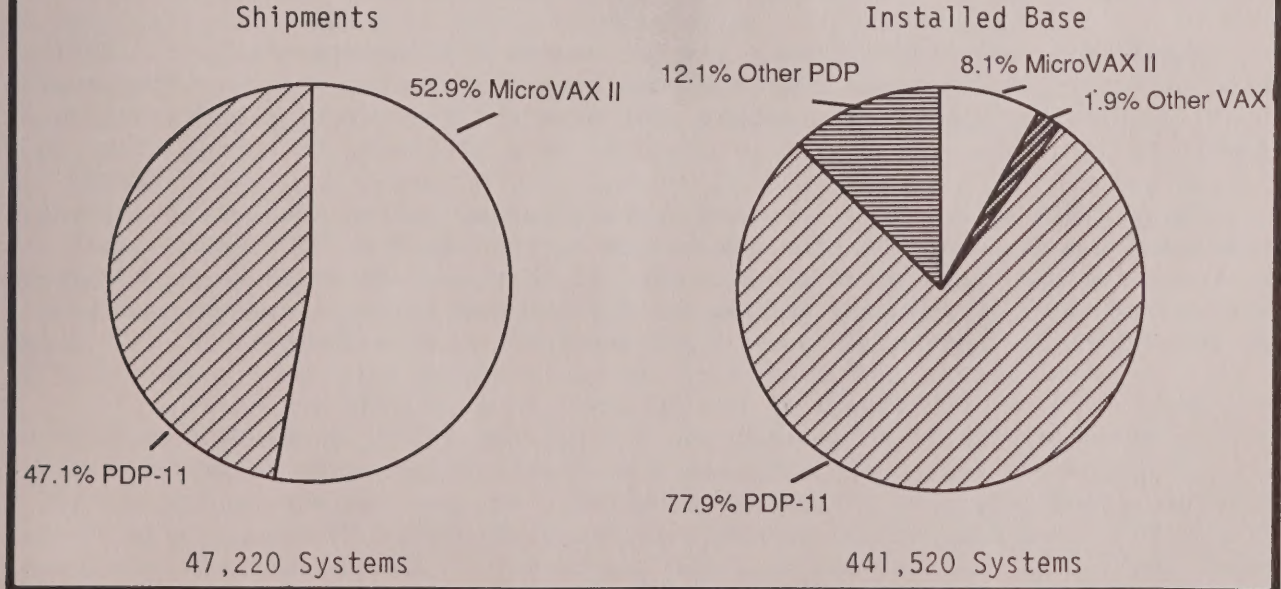

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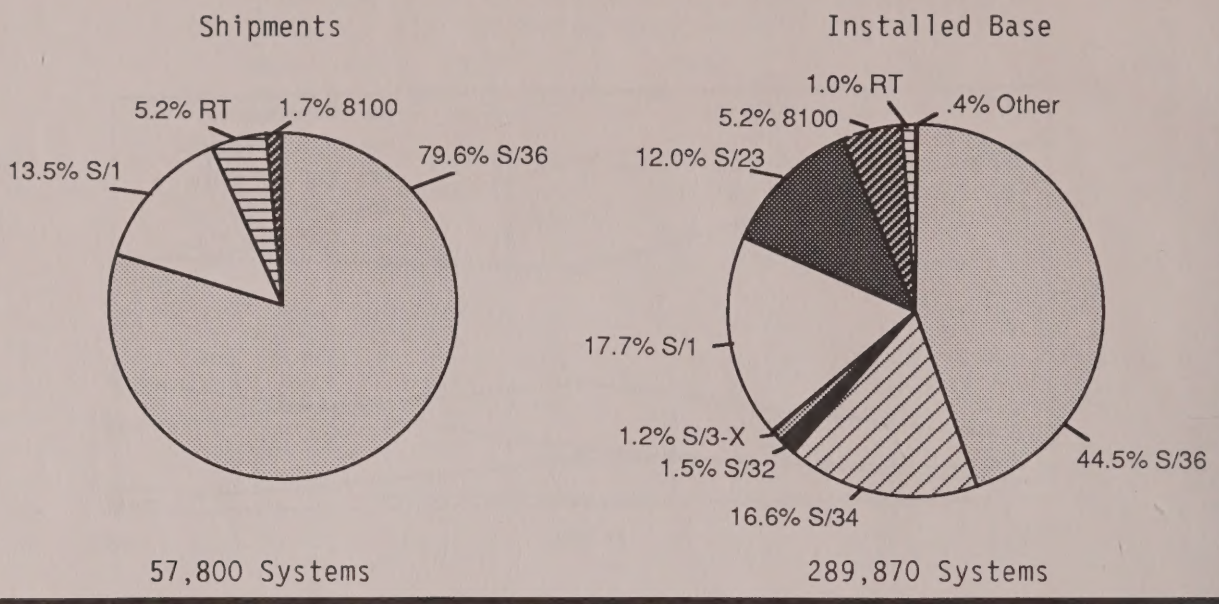
1986 IBM WORLDWIDE SMALL-SCALE SHIPMENTS AND INSTALLED BASE BY FAMILY



Of course, the glitch is that it's also a near doubling for 1985 as well, since the value of IBM small-scale shipments stood still at $2.7 billion from 1985 to 1986. It does seem that 1986 was the year when the S/36's bad rep finally began to catch up with it in customer sales. Moreover, IBM didn't just have one incompatible architecture besides its best-selling small-scale system: it had three (the S/1, the 8100, and the RT). And none of them were compatible with IBM's medium-scale systems (S/370, S/38, and the OEMed S/88).

IBM is racing with new hardware and communications products and marketing strategies to address the problem. The thrust is to emphasize two midrange architectures, S/370 for users who require a high level of interaction with IBM's large-scale systems and S/3X for those who don't. The S/1 and S/88 are being positioned for communications, and the RT as the technical workstation/PC that IBM intended it to be all along. Communication links and the lavishly leaked "Silverlake" product would unite the S/36 and S/38, while IDC expects that smaller 9370s will soon bring S/370 architecture into small-scale systems.

But it's a race against time. As the demand for departmental and distributed processing accelerates over the next couple of years, vendors with proprietary architectures must ensure that they make the first cut as users begin to commit to solutions. Otherwise it could be very difficult to recoup later on.

Quo Vadis. Moreover, all vendors participating in the small-scale market must take into account the probable future encroachment on it from top and bottom. The top they probably won't mind if they are active there, since it's midrange vendors introducing medium-scale functionality at near-small-scale price/performance that will, they hope, eat into small-scale sales.

But beneath is the threat of the PC LAN. Because LANs are still so expensive and difficult to install and debut, only 15% of large MIS shops in a recent IDC survey felt that they were a realistic alternative to minis. However, standards, new networking technology, and meatier supermicro servers (e.g., 80386-based systems) are obviating many of the problems. It's an ocean where the little fish eat the big, and there're lots of smaller fish out there.

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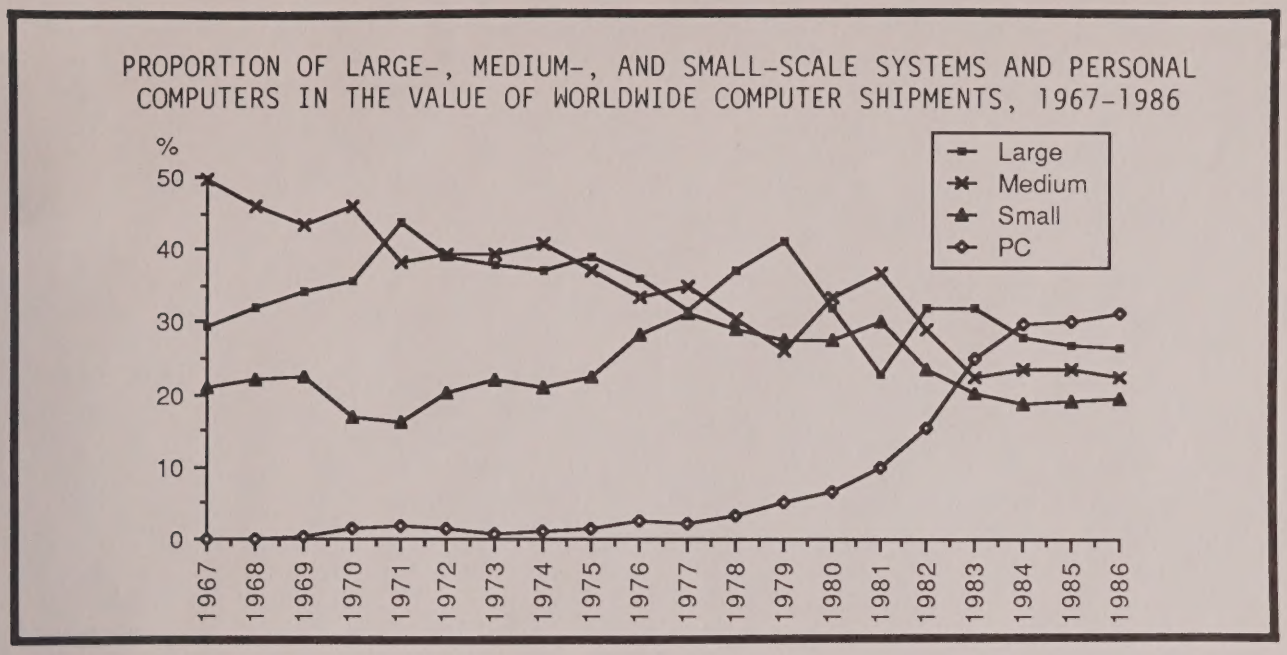

A Note on Downsizing

The slump in large- and medium-scale system growth raises the question of whether there is a secular trend towards downsizing that inevitably dooms the bulkier and pricier systems to very low future growth rates. There are at least three issues involved in evaluating the significance of downsizing:

- Whether users are choosing to acquire lower-cost systems, especially PCs, to perform discrete tasks of more immediate cost-effectiveness than the ones they would run on larger systems.

- Whether users are actually performing on smaller systems with much better price/performance many of the same applications they would otherwise be running on larger systems.

- Whether downsizing is balanced by the trend towards upsizing.

It is clear that the first two types of downsizing -- of MIS budgets, and of applications -- are both major factors today. The first has been particularly important of late. Not only has departmental computing begun to come into its own, but it is often easier for departments to get PCs and minis than it has been for corporate MIS to make a case for another mainframe.

Whether this is a permanent development is not so clear. On the one hand, true distributed processing is still a couple of years away. When it comes, the decentralization of computing on microprocessor-based PCs and small-scale systems will increase downsizing's current momentum considerably. On the other hand, if new software is developed requiring high performance levels, and if capital expenditures become less tight than they have been in the U.S. of late, decentralization need not demand low growth for larger systems.

That is because of escape hatches in the first definition of downsizing. First, the scenario envisioned allows different uses of larger systems from smaller. Second, perceptions of "cost-effectiveness" can change depending on how effective particular machines are in particular environments, and on how much money is available when factoring in cost.

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That is why the second definition is so crucial. If the same applications can run adequately on systems with far superior price/performance, only the masochistic would invest in larger-scale solutions. After all, today's microprocessors can perform tasks that not long ago would have required a mainframe, and tomorrow's will be even more powerful. Already PCs account for much of the computing that five years ago a mainframe would have processed in batch.

Nevertheless, despite the ascent of the PCs, the installed MIPS on large-scale systems in the U.S. have been growing at around 40% a year through the 1980s, compared to 25-35% in the 1970s. Obviously, if some applications are being downsized, enough are being upsized to maintain large-scale MIPS growth. And indeed, new tasks that can take the place of the old are being found. Two of the most significant for absorbing MIPS in recent years have been relational database management programs and online transaction processing.

Thus if downsizing has been a megatrend, so has upsizing. Indeed, if one looks at the proportion of different classes of systems in the value of worldwide shipments over the past two decades, one finds no secular trend towards downsizing. Rather than secular, the trends are cyclical, depending largely on product cycles. True, the impact of the PC in the 1980s is clear. However, it seems that it has absorbed market shares from all multiuser systems. Due to the presence of PCs, it seems likely that future downsizing/upsizing cycles for multiuser systems will not be as sharp as in times past, but that is not evidence that they will go away, or that PCs will replace mainframes.

In fact, despite the Great Softness -- even despite the expectations of many of the MIS managers surveyed in 1986 -- the installed MIPS on IBM large-scale systems in the U.S. grew roughly the same 40% last year that they had earlier in the decade, before the downturn.

This is not to say that the mainframe won't go the way of the dodo and dinosaur, only that it need not. As Justice Brandeis is reputed to have said, "The irresistible is often only that which is not resisted." The mainframe probably is doomed unless large-scale vendors develop new uses to which it can be put, which means, in short, new and improved software. But then, thus ever has it been, and ever shall it be.

INSTALLED MIPS* ON IBM U.S. LARGE-SCALE SYSTEMS, 1981-1986
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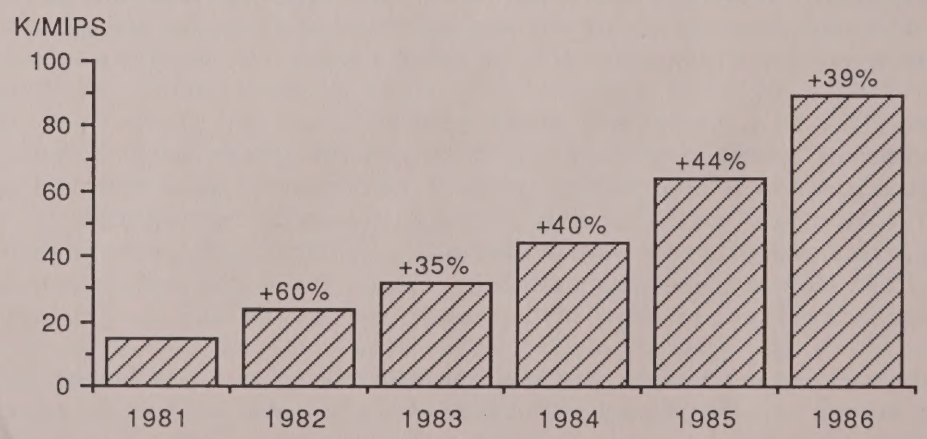

*MIPS should be understood as a conversion factor representing the midpoint of comparative performance ranges as announced by IBM.

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THE GRAY SHEET
Computer Industry
REPORT

D.C.BELLOMY, EDITOR August 3, 1987 • VOL.23, NO.5-6 P.J.MCGOVERN, PUBLISHER

LEAVING MISS HAVISHAM'S MANSION: MODERATE GROWTH REPLACES GREAT EXPECTATIONS IN THE WAKE OF THE GREAT SOFTNESS

Unless you worked for or owned stock in Digital or one of the handful of other companies that established themselves as exceptions to the rule, 1986 was not a year to recall with fervor or even a modicum of fondness. Particularly if a vendor were heavily dependent on sales to the U.S. market, where hardware shipment value grew only a paltry $400 million last year, the industry topography was again dominated by the continuing Great Softness.

It was a less traumatic year than 1985, even though growth was markedly lower (in the critical U.S. market, the value of hardware shipments that year grew over $1.8 billion in what most considered a very weak showing). Lower growth in 1986 had less impact because most participants had been forewarned. When the Great Softness first hit in early 1985, production rates, inventories, and staffing were still geared for the boom days of 1982-84, when shipment value was regularly growing around 30% a year. Last year saw more than its share of the human anguish that comes from layoffs and relocations, but in general vendors were better braced for lower revenue growth.

Nevertheless, it was an enervating period for many companies, as the industry obstinately refused to pick up steam quarter after quarter.

- IDC estimates that the value of worldwide shipments by U.S.-based vendors grew a little over 5% in 1986, to $66.3 billion.

- Most of this growth accrued from the weak dollar, since the value of international shipments rose just over 12%, to $26.9 billion. For the first time, the percentage of U.S.-based vendors' shipment value from the international side of the ledger surpassed 40%.

- The value of U.S. shipments grew only 1%, to $39.4 billion.

- The share of worldwide shipment value accounted for by large- and medium-scale systems both dipped in 1986, to 26.5% and 23% respectively. The share of small-scale systems increased marginally to 19.5%, while personal computers jumped a percentage point to 31%. PCs were even more critical in the U.S. market, where they comprised 36% of the value of shipments. Only in international shipment value did large-scale systems retain the largest share.

- Because the value of IBM's shipments was flat, its share of the worldwide value of U.S.-based vendors' computer system shipments fell from almost 43% to under 41%. In the U.S., the value of IBM shipments plummeted 8%; its market share dropped from 39.5% to 36%.

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GROWTH IN THE VALUE OF IBM SHIPMENTS VIS-A-VIS GROWTH IN THE VALUE OF TOTAL WORLDWIDE SHIPMENTS BY U.S.-BASED VENDORS, 1982-1986
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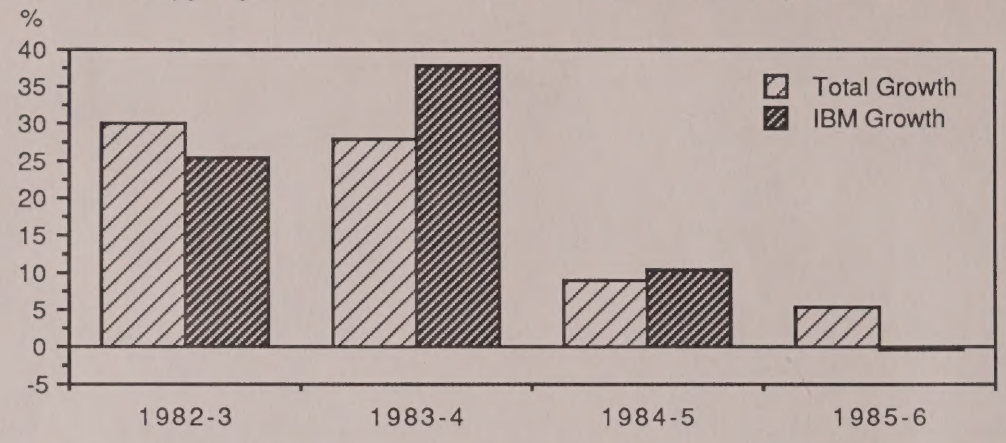

There are increasing signs that, except for IBM (see page 15) and a few others (e.g., DG), the Great Softness has finally begun to abate. But what does a firming of the market actually entail? A return to 30% growth, or even to the 20% compound annual growth rate for 1981-86, with its balance of three years of great plenty and two of famine?

The Gray Sheet must unhappily report that it doesn't seem likely. The current projection is for 9% growth in 1987, to around $72.2 billion. This is assuming roughly the same currency-fed 12% increase in the value of international shipments. The value of U.S. shipments, IDC believes, should grow around 7%, to $42.1 billion.

Ironically, then, U.S.-based vendors' growth in shipment value in 1987, the first year of recovery from the worst of the Great Softness, would be the same as in 1985, the first year of the Great Softness, when worldwide shipment value also grew 9%. The answer to the anomaly is that IBM did a little better than the industry average in 1985, while in 1987 it will lag behind -- not, in all probability, as far behind as last year, but when a company that accounts for over a third of the industry's shipment value grows only 5% in hardware sales for the first half of the year, prudence dictates that a projection of the industry's overall growth rate for the year should not be overly optimistic.

To break down the revenue growth into its components by size class, the Gray Sheet and IDC currently expect the value of large-scale system shipments to grow around 4% this year, to around $18.25 billion. This is only a little better than the growth registered in 1986, as the new 3090 midlife kickers and three new models do not seem to be garnering a dramatic response from users.

The medium-scale market should be more vigorous, with 9370s shipping for the second half of the year and Digital transferring some of its 1986 MicroVAX II growth into its 8XXX line, and most of the other players in the sector having decent years. IDC currently projects 8% growth to around $16.2 billion, much better than the 1% growth tallied in 1986.

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VENDOR SHARES OF WORLDWIDE COMPUTER SHIPMENT VALUE BY U.S.-BASED MANUFACTURERS, 1986
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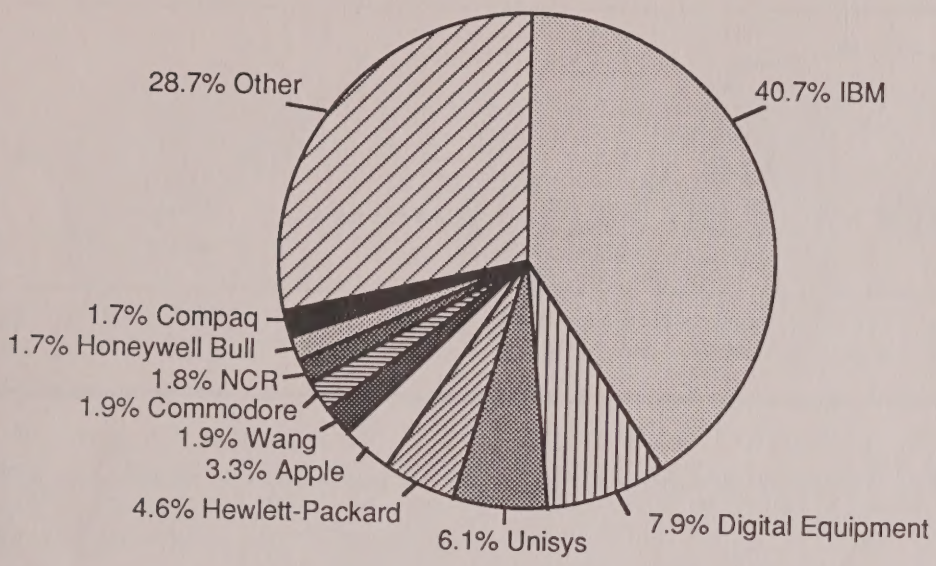

$66.3 BILLION

In small-scale systems, little change is anticipated from the 7+% growth achieved in 1986. This sector should reach around $13.9 billion in 1987.

Altogether, then, multiuser system shipment value is expected to grow some 6% in 1987. The engine accounting for the 9% momentum would therefore be personal computers, whose shipment value, IDC believes, should grow circa 15% this year to $23.9 billion. Five factors that should be singled out for their contribution to this growth are a moderate turnaround for IBM due to PS/2 sales; the advent of 80386-based PCs; strong sales for 80286-based PCs from the stronger compatible manufacturers; Apple's continued strong recovery; and the emigration of technical workstations to corporate and government environments.

WORLDWIDE VALUE OF COMPUTER SYSTEM SHIPMENTS BY SIZE CLASS, 1987
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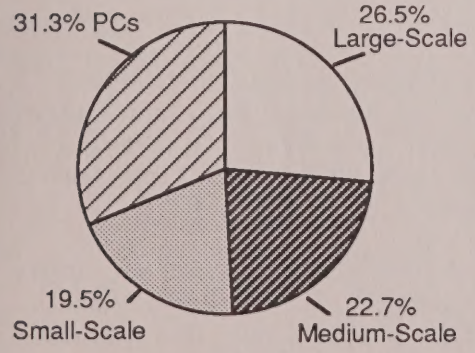

$66.3 BILLION

VALUE OF WORLDWIDE COMPUTER SHIPMENTS BY SIZE CLASS, 1981-1991
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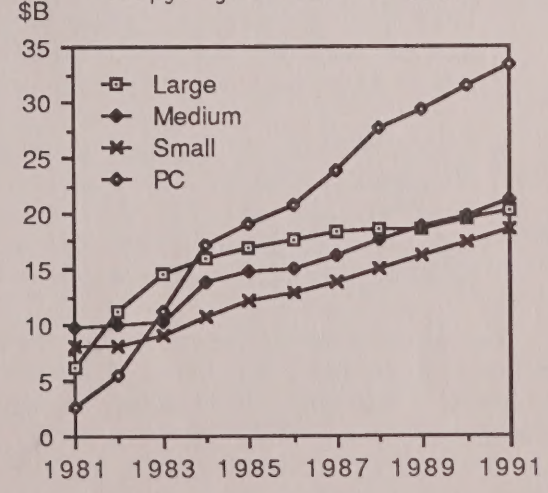

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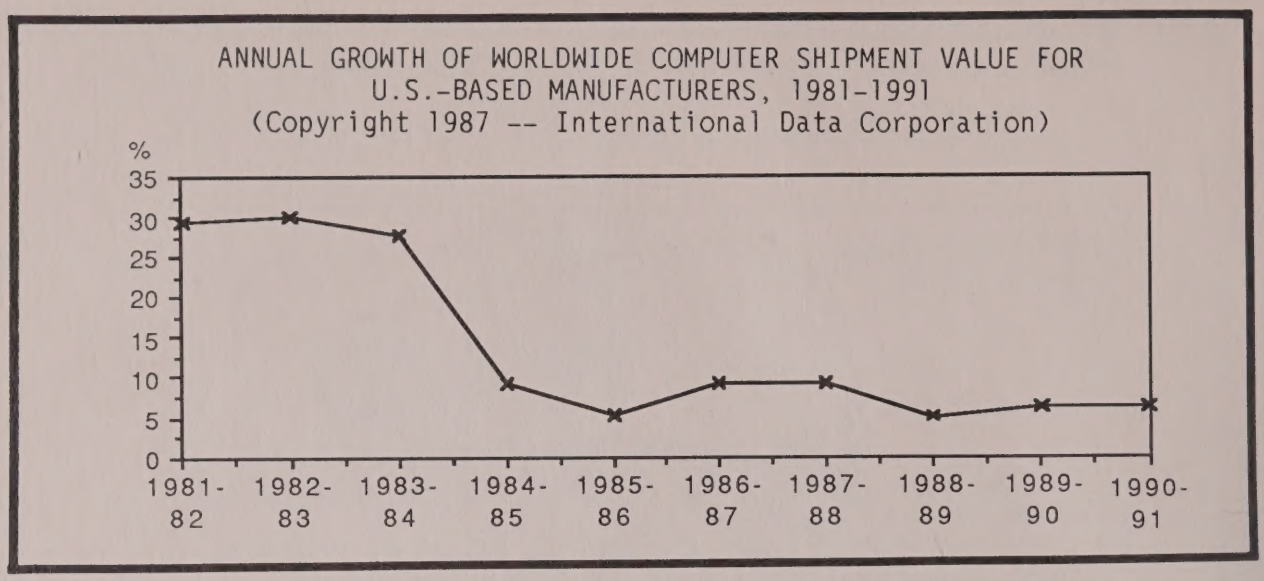

Beyond 1987, IDC right now expects 1988 to show around the same 9% growth. As for beyond 1988. . . . Now, like Uriah Heep, the Gray Sheet is 'umble, sir, and realizes the difficulty of projecting too far into the future. But we all have to do it, hopefully with the proper appreciation of ongoing and emerging trends, common sense, and, yes, humility. In that spirit:

- The view from this corner is that 1987 and 1988 will be the best years for a while. The compound annual growth of shipment value projected for 1986-91 is only a tad over 7%, with a slight pickup again toward the end of the period.

- One factor will be a tailing off of large-scale system shipments as the next "Summit" generation is prepared, but since shipments will not have been that strong in the first place, this will be a less critical element than in some other mainframe transitions.

- The chief reason for the industry's lower annual growth rate is an anticipated decline in PC value growth to 6-7% p.a. in the 1989-91 time frame. The robust growth expected this year and next would, in this scenario, be diminished by price erosion and lower demand after the initial impact of the PS/2 and 80386-based PCs. A secondary factor would be that international growth would no longer lead U.S. growth as dramatically. Indigenous manufacturers would assume much of the less expensive IBM-compatible production, a trend that has already begun with vendors like the U.K.'s Amstrad.

- Nevertheless, 7% annual growth involves a lot of money. Worldwide shipment value of $66.3 billion in 1986 would leap to $93.35 billion in 1991, and for the U.S. segment would jump from $39.4 to $54.5 billion. The worldwide installed base of over 95 million computers from U.S.-based vendors would be worth nearly $590 billion.

The lesson would seem to be that the Great Softness, rather than simply a cyclical downturn, was also a secular rite of passage into a more mature industry. The possibility of higher growth rates in the 1990s and beyond cannot be discounted, particularly if new software expands the applications and utility of hardware, but it will be growth that must be paid for in blood, sweat, toil, and tears. The easy times are over.

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LEADING U.S. COMPUTING ENVIRONMENTS BY SHIPMENT VALUE, 1986 AND 1991
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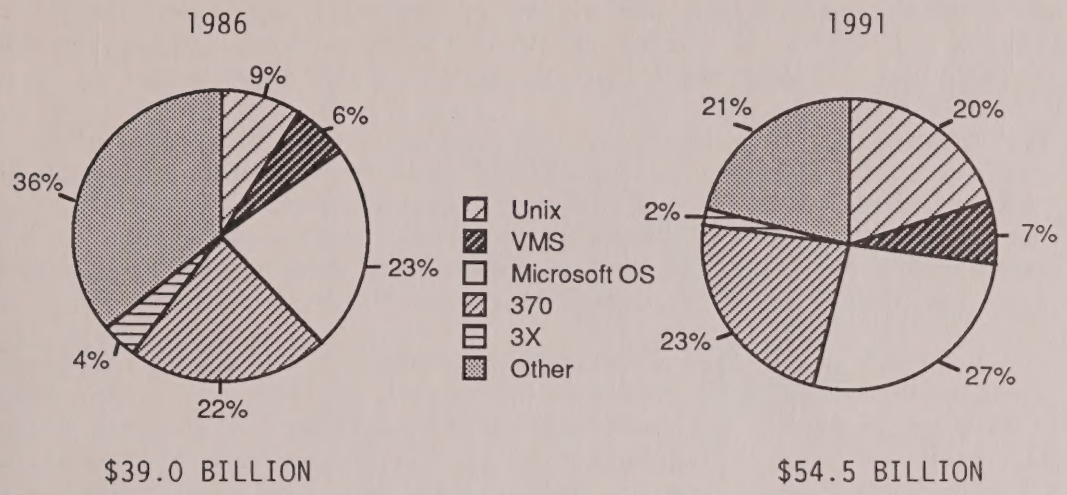


Minor adjustments are expected in the leading computing environments. Over the next five years, for example, the S/370 universe will grow faster than the industry average despite the weak sales of mainframes as IBM brings it deeper down into the midrange with 9370 models, current and anticipated.

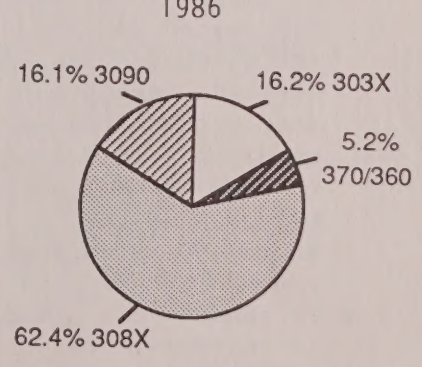
One segment that should continue to grow rapidly for a time is VMS. The value of Digital hardware shipments grew at a clip approaching 17% in 1986 to $5.3 billion, as DEC increased its share of the worldwide market among U.S. vendors from 7% to 8%. Every sign indicates a repeat performance through the remainder of 1987. By mid-1988, though, Digital could find the growing a bit rougher, not only because of renewed midrange competition from IBM but also because of VMS's deficiencies in OLTP and the backlog in application porting.

Strong growth for Unix is anticipated, as it finally begins to fulfill its promise. Its dominance in the workstation market, for example, is increasing its leverage beyond its technical base throughout niches of corporate America.

And then there's the Microsoft world, Bill Gates's billion-dollar baby. But that's another story: the story of PCs yesterday, today, and tomorrow.

DEPARTMENT OF EXPLICATION AND AMPLIFICATION

It has belatedly come to the Gray Sheet's attention that an error crept into one of the charts in the Review and Forecast issue dealing with the large-scale systems market (Vol. 22, No. 19-20, February 27, 1987). In the series of pie charts labelled "IBM Worldwide Large-Scale Installed Base by System Family, 1981-1986" on page 7, the 1986 pie was drawn correctly, but it erroneously repeated the labels for 3090 and 308X systems from the 1985 pie. It should read as printed to the right. The Gray Sheet always endeavors to make Review and Forecast issues as accurate as possible. We apologize.



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PC MARKETS: THE STORM WITHIN THE CALM

Oxymoronically enough, 1987 is a time of unprecedented stability in the personal computer revolution, and a time of unparalleled uncertainty. The stability is a function of the maturing of the PC market. Often for the first time, trend lines followed more or less predictable trajectories.

- For the second straight year, 1986 saw growth in the value of worldwide PC shipments by U.S.-based vendors in the vicinity of 10% (9% in 1986, 11% in 1985), after the awesome rates registered earlier in the decade. The current market growth maps into what IDC expects for the rest of the decade -- a compound annual growth rate for 1986-91 of 10%, compared to the 50% rate for 1981-86.

- As a result, while personal computers continue to be the fastest growing segment in the industry (9% growth in 1986 contrasted with a rate under 4% for all multiuser systems), they are ceasing to be the inexorably expanding market force that could make millionaires of kids with extra space in their garage, and billionaires of Harvard dropouts. The 1981-86 annual growth rate for the value of worldwide multiuser system shipments paled beside the rate for PCs (13.5% vs. 50%), but should lag less dramatically for the next five-year period (6% vs. 10%).

- Even with the exfoliation of vendors and the explosion of inexpensive models, the same three vendors -- Commodore, IBM, and Apple -- have held the top three slots in U.S.-based unit shipments both in the U.S. and worldwide for three consecutive years. Although their combined share has been slipping, in 1986 it was still 60% of worldwide unit PC shipments by U.S.-based vendors.

- Despite all the hurly-burly, the other standard-bearers in PC unit shipments have remained surprisingly stable. Relative positions have changed, but of the nine market leaders in U.S. shipments in 1982, only Sinclair and TI are now missing. Their replacements are Compaq and Leading Edge, with AT&T rounding out the top ten. The others are Commodore, IBM, Apple, Tandy, Atari, HP, and Zenith.

- The trend towards consolidation around industry-standard operating systems continues apace. The number of shipments of PCs capable of running MS-DOS just missed hitting 50% of total U.S. unit shipments in 1986, and accounted for 45% of worldwide unit shipments by U.S.-based vendors. Shipments of PCs running MS-DOS grew 25% worldwide in 1986, while the number of non-MS-DOS PCs shipped in 1986 was essentially flat compared to 1985. Hence the 10% growth rate for all PCs was entirely a function of IBM compatibility. The situation was even starker in the value of PC shipments, where PCs running MS-DOS comprised nearly 63% of the worldwide total. The value of shipments of PCs with MS-DOS grew 26% in 1986; the value of non-DOS PC shipments fell nearly 10%.

- In the non-DOS universe, Apple's operating environments are increasingly the only significant proprietary alternative to DOS's dominion, while the dominance of Unix in the remunerative and growing workstation market accounts for a critical niche.

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The origin of the uncertainty can be dated fairly precisely: April 2, 1987. That was the date IBM announced the PS/2, and IBM and Microsoft jointly announced OS/2. It is because the Microsoft/IBM compatible market has become the focal point of personal computing that the two announcements, so long anticipated yet so murky in their consequences, generated confusion and anxiety.

The PS/2. Historians of personal computing will inscribe 1986 as the year of the compatible; IBM will remember it as the year its hold on the PC marketplace slipped. It lost market share in 1986 in favor of bargain basement clones and was outperformed by machines from the likes of Compaq, and even PC's Limited.

The slippage occurred in both unit shipments and the value of shipments. In units, IBM's share of MS-DOS-compatible PCs shipped worldwide by U.S.-based vendors fell from almost two-thirds in 1985 (65%) to under half (48%) in 1986. The clonemakers shipped some 400,000 units more than IBM in the U.S., and 160,000 more internationally. Even in the value of shipments, the ability of other vendors to pour forth a flood of AT-compatibles eroded IBM's share of the DOS market. In 1985, IBM held a 66% share of the value of worldwide DOS-compatible

VENDOR SHARES OF THE U.S. PC MARKET, 1986
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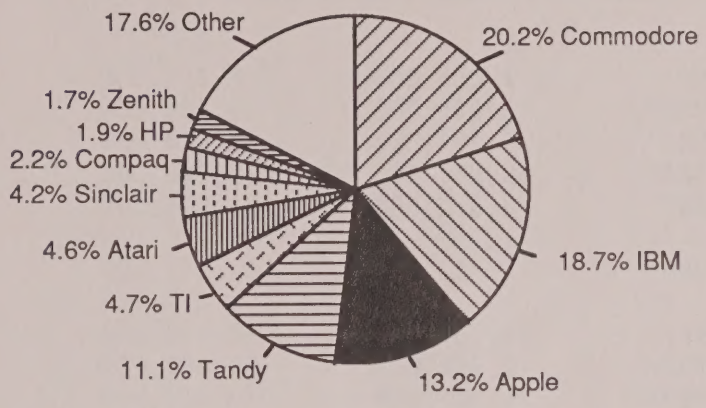
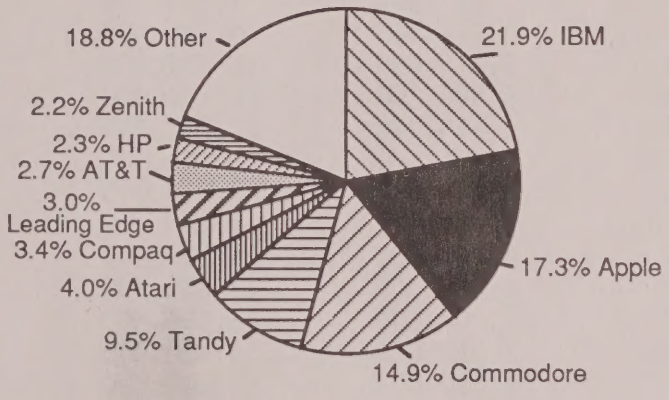
INSTALLED BASE



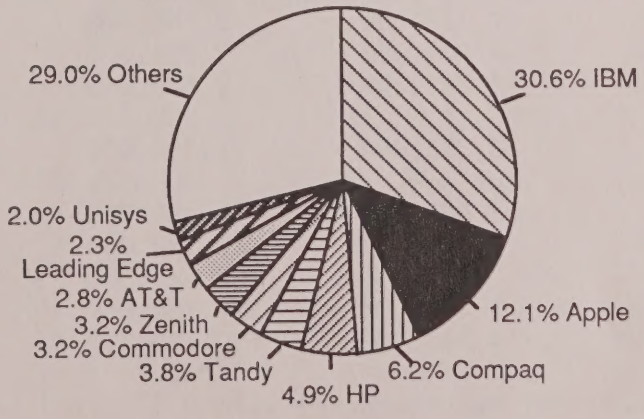
28,658,000 UNITS

SHIPMENTS



6,365,000 UNITS

VALUE OF SHIPMENTS



$14.2 BILLION

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PERSONAL COMPUTER MARKET -- U.S.-Based Manufacturers*
(Copyright 1987 -- International Data Corporation)

	Number of Systems Shipped	Cumulative Number in Use	$ Million Value Shipped	$ Billion Value in Use
		WORLDWIDE		
1981	1,055,000	2,299,000	2,705	7.4
1982	3,945,000	6,230,000	5,360	12.5
1983	7,191,000	13,414,000	11,305	23.3
1984	9,657,000	23,060,000	17,170	38.6
1985	8,860,000	31,905,000	19,070	55.1
1986	9,737,000	41,613,000	20,760	74.3
1987	10,131,000	50,950,000	23,900	93.5
1988	10,845,000	60,650,000	27,620	115.0
1989	11,242,000	70,400,000	29,350	131.8
1990	12,100,000	80,600,000	31,370	150.7
1991	12,830,000	90,900,000	33,450	170.8
		UNITED STATES		
1981	757,000	1,714,000	1,945	5.1
1982	3,014,000	4,720,000	4,180	9.1
1983	5,416,000	10,132,000	8,715	17.3
1984	6,580,000	16,706,000	12,960	28.5
1985	5,621,000	22,317,000	13,320	40.2
1986	6,365,000	28,658,000	14,170	53.5
1987	6,482,000	34,500,000	16,010	66.5
1988	6,940,000	40,600,000	18,360	80.5
1989	7,300,000	46,800,000	19,200	89.5
1990	8,090,000	53,500,000	20,750	102.0
1991	8,550,000	60,200,000	22,200	115.4
		INTERNATIONAL		
1981	298,000	585,000	760	2.3
1982	931,000	1,510,000	1,180	3.4
1983	1,775,000	3,282,000	2,590	6.0
1984	3,007,000	6,354,000	4,210	10.1
1985	3,239,000	9,588,000	5,750	14.9
1986	3,372,000	12,955,000	6,590	20.8
1987	3,649,000	16,450,000	7,890	27.0
1988	3,905,000	20,050,000	9,260	34.5
1989	3,942,000	23,600,000	10,150	42.3
1990	4,010,000	27,100,000	10,620	48.7
1991	4,280,000	30,700,000	11,250	55.4

* International Manufacturers with U.S.-based sales offices are counted in U.S. totals, but not in international.

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COMPUTER MARKET SUMMARY -- U.S.-BASED MANUFACTURERS*
(Copyright 1987 -- International Data Corporation)

	Number of Systems Shipped	Cumulative Number in Use	$ Million Value Shipped	$ Billion Value in Use
		WORLDWIDE		
1981	1,269,400	3,384,400	26,815	148.9
1982	4,238,500	7,575,900	34,700	175.1
1983	7,490,400	15,022,600	45,135	208.7
1984	10,055,700	25,011,100	57,715	251.5
1985	9,228,500	34,156,700	62,970	293.3
1986	10,102,600	44,159,700	66,260	339.1
1987	10,517,200	53,812,800	72,230	385.9
1988	11,277,900	63,863,200	78,740	436.9
1989	11,715,600	73,992,000	82,710	483.6
1990	12,620,500	84,589,800	88,000	534.1
1991	13,404,000	95,319,700	93,350	588.1
		UNITED STATES		
1981	882,800	2,404,100	16,935	86.4
1982	3,196,200	5,570,400	22,260	104.1
1983	5,609,200	11,151,400	28,695	126.2
1984	6,852,100	17,960,900	37,170	154.7
1985	5,860,400	23,769,100	39,005	181.9
1986	6,595,700	30,300,100	39,400	210.5
1987	6,724,500	36,336,900	42,110	239.1
1988	7,211,300	42,656,200	46,160	269.8
1989	7,595,800	49,090,200	48,050	295.6
1990	8,414,600	56,032,400	51,380	325.3
1991	8,908,400	63,000,100	54,500	357.7
		INTERNATIONAL		
1981	386,600	980,300	9,880	62.5
1982	1,042,300	2,005,500	12,440	71.0
1983	1,881,200	3,871,200	16,440	82.5
1984	3,203,600	7,050,200	20,545	96.8
1985	3,368,100	10,387,600	23,965	111.4
1986	3,506,900	13,859,600	26,860	128.6
1987	3,792,700	17,475,900	30,120	146.8
1988	4,066,600	21,207,000	32,580	167.1
1989	4,119,800	24,901,800	34,660	188.0
1990	4,205,900	28,557,400	36,620	208.8
1980	4,495,600	32,319,600	38,850	230.4

*Dollar values merge PC retail sales with multiuser manufacturer revenue.

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U.S. VENDORS' 1986 WORLDWIDE PC SHIPMENTS -- VALUE (Left) & UNITS (Right)
(Copyright 1987 -- International Data Corporation)

Vendor	Value ($M)	Percent
IBM	6,750	32.5
Apple	2,160	10.4
HP	1,300	6.3
Commodore	1,250	6.0
Compaq	1,030	5.0
Tandy	680	3.3
Zenith	585	2.8
Atari	460	2.2
Unisys	440	2.1
AT&T	390	1.9
Others	5,715	27.5
Total	20,760	100.0

Vendor	Units	Percent
Commodore	2,355,000	24.2
IBM	2,110,200	21.7
Apple	1,375,000	14.1
Tandy	753,000	7.7
Atari	460,000	4.7
Compaq	259,000	2.7
HP	239,300	2.5
Leading Edge	205,000	2.1
Zenith	183,000	1.9
AT&T	170,000	1.7
Others	1,627,500	16.7
Total	9,737,000	100.0

PC shipments by U.S.-based vendors; in 1986, its share was 52%. From the perspective of the overall PC market, IBM's share of worldwide unit shipments fell from 27% in 1985 to 22%, and of the value of PC shipments from 36% to 32%.

The bottom line was that in a year when the PC market as a whole was growing 9% in the value of worldwide shipments, and the market for DOS-compatibles was swelling 24%, the value of IBM shipments dipped 2%.

The single-user-oriented systems introduced by IBM in 1986 -- the RT PC, the PC Convertible, and the XT-286 -- proved of little assistance. Both the RT and the Convertible would receive much needed enhancements in 1987, but neither could be regarded as offering much potential for a turnaround in IBM PC sales. In fact, because its predominant use turned out to be as a multiuser system, by early 1987 even IBM was classifying the RT as a midrange product.

Consequently, IBM had a lot riding on the April 2 announcement. As an integrated system rather than an open, ill- or undefined box, the PS/2 had the potential to regain market share for IBM by pushing personal computing into its next generation. And by employing more IBM-specific technology, in particular the Micro Channel bus on most models, it could, if it chose, seize the opportunity to not only retard but check the clonemakers.

U.S. VENDORS' 1986 PC WORLDWIDE INSTALLED BASE -- VALUE (Left) & UNITS (Right)

(Copyright 1987 -- International Data Corporation)

Vendor	Value ($B)	%
IBM	20.2	27.3
Apple	7.3	9.8
HP	5.6	7.6
Commodore	5.1	6.8
Tandy	3.4	4.6
Zenith	2.7	3.6
Compaq	2.4	3.2
Atari	1.8	2.4
Unisys	1.8	2.4
Digital	1.3	1.8
Other	22.6	30.5
Total	74.3	100.0

Vendor	Units	%
Commodore	12,282,300	29.5
IBM	7,205,700	17.3
Apple	4,740,100	11.4
Tandy	3,663,000	8.8
Atari	2,331,000	5.6
TI	1,393,500	3.3
Sinclair	1,200,000	2.9
HP	954,650	2.3
Compaq	706,000	1.7
Zenith	630,000	1.5
Other	6,506,750	15.6
Total	41,613,000	100.0

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IBM WORLDWIDE PC SHIPMENTS AND INSTALLED BASE BY FAMILY, 1986
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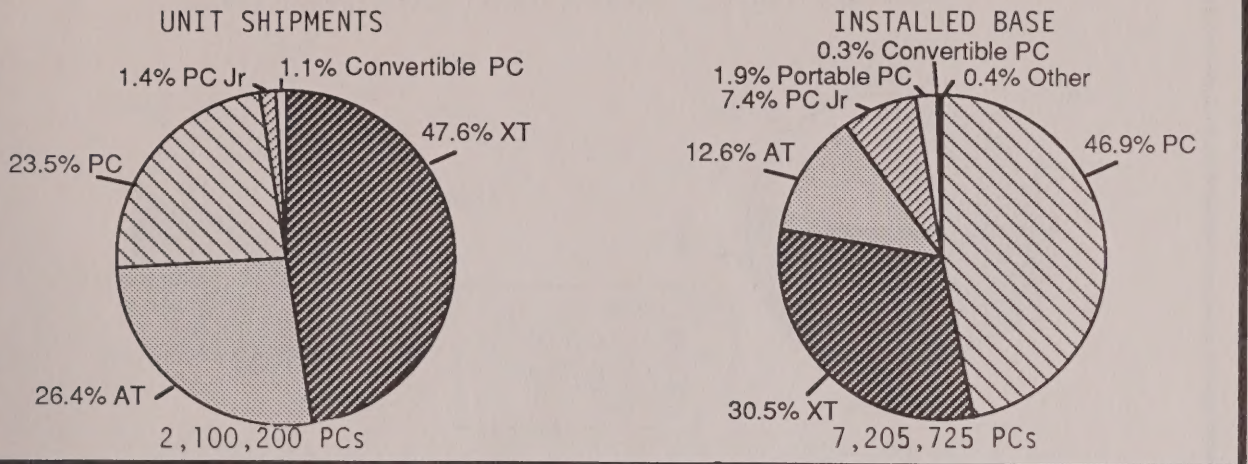
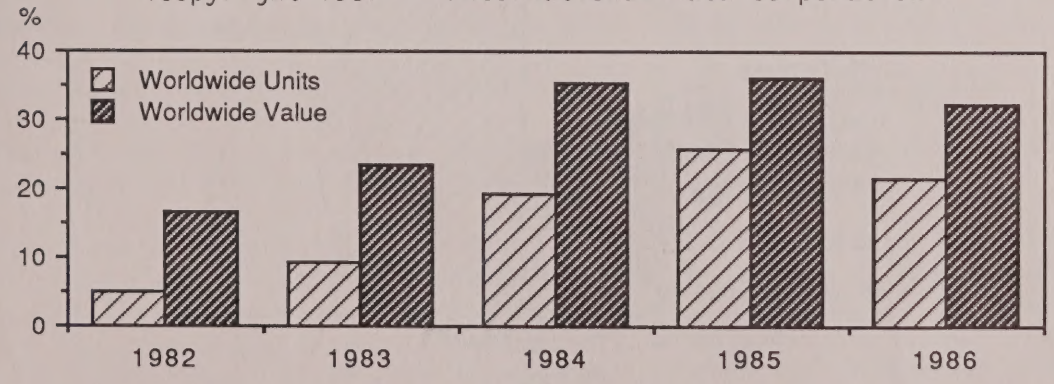


In taking these steps, however, IBM inevitably triggered user uncertainty. IDC has been regularly sampling corporate reaction to the new PC generation since the April introduction. At first, many customers were wary. About a quarter of the large sites surveyed in April were anticipating a delay in their PC purchase plans over the next six months while they evaluated the pros and cons of the PS/2.

The two sticking points for many have been the PS/2's 3.5" diskettes ("floppies" is no longer a meaningful term for these durable little disks) and software availability. On the first issue, one could argue that it was surprising that there wasn't an even more negative reaction, since users see conversion of existing software from 5.25" floppies as an expensive and time-consuming process. However, sophisticated PC users are increasingly aware of the technological progress represented by 3.5" diskettes, and many view conversion as an unpleasant but ultimately rewarding necessity.

Software availability is a bigger bugbear. The operating system advertised as taking optimum advantage of the PS/2 won't be available until next year, and a plethora of applications until late 1988 or later. Why, some users wondered, rush to buy PS/2s now to run their XT and AT programs?

IBM SHARE OF WORLDWIDE PERSONAL COMPUTER SHIPMENTS AND SHIPMENT VALUE, 1982-1986
(Copyright 1987 -- International Data Corporation)



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WORLDWIDE PERSONAL COMPUTER UNIT SHIPMENTS BY VENDOR/MICROPROCESSOR GROUP, 1986 AND 1991
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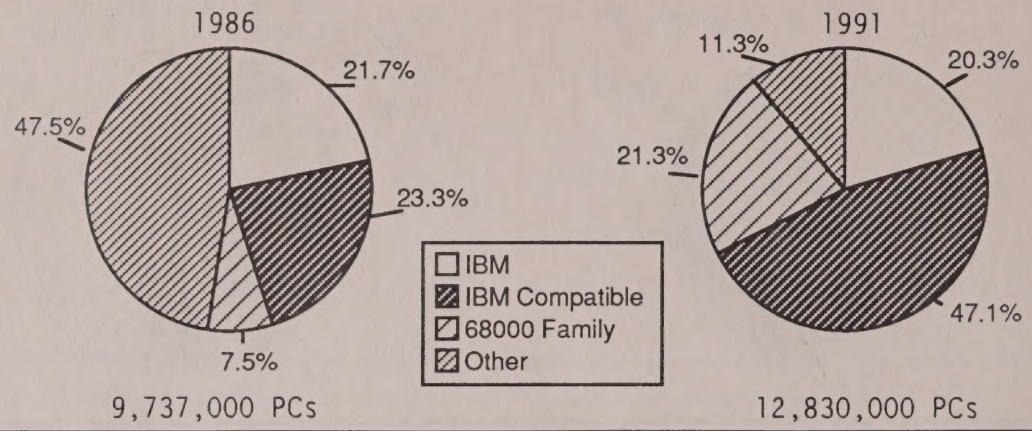
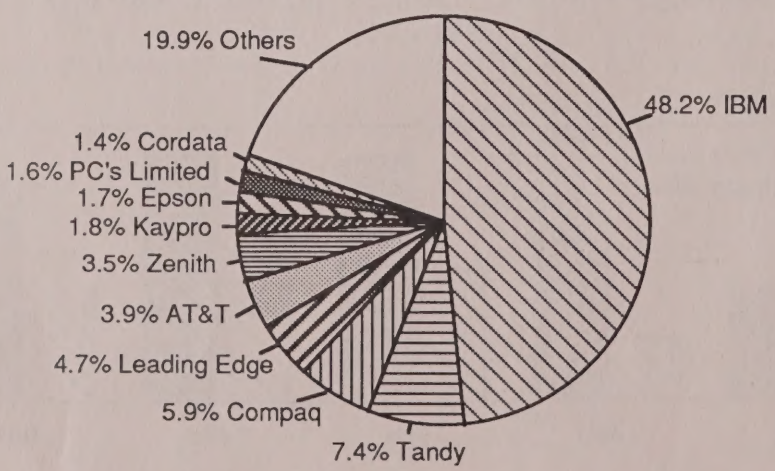


Nevertheless, IDC's surveys indicate that enough users are making up their minds in favor of the PS/2 to beef up sales in the second half of the year. IDC's PC Advisory Service estimates that as momentum grows, PS/2s will have accounted for over 40% of IBM's unit PC shipments in 1987. PS/2 shipments in 1988 should better than double this year's numbers.

A major factor behind the emerging strength of the PS/2 is IBM's decision to emphasize it at the expense of other PC products. IBM killed off the original PC and has stopped the assembly lines for XTs and perhaps even, if some rumors are to be believed, ATs as well. One beneficiary has been the PS/2-30, which otherwise would have been at a competitive disadvantage due to its exclusion from the Micro Channel architecture and OS/2.

There are other beneficiaries as well, since IBM's emphasis on PS/2s is (at least temporarily) helping out quality compatible manufacturers like Compaq. Users who want time-proven PCs with easy access to existing 5.25" software have more incentive than ever to turn to IBM's compatible competitors. This, we may surmise, is not what IBM had in mind.

U.S.-BASED VENDOR SHARES OF WORLDWIDE IBM-COMPATIBLE PC SHIPMENTS, 1986
(Copyright 1987 -- International Data Corporation)



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VALUE OF WORLDWIDE PERSONAL COMPUTER SHIPMENTS BY VENDOR/MICROPROCESSOR GROUP, 1986 AND 1991
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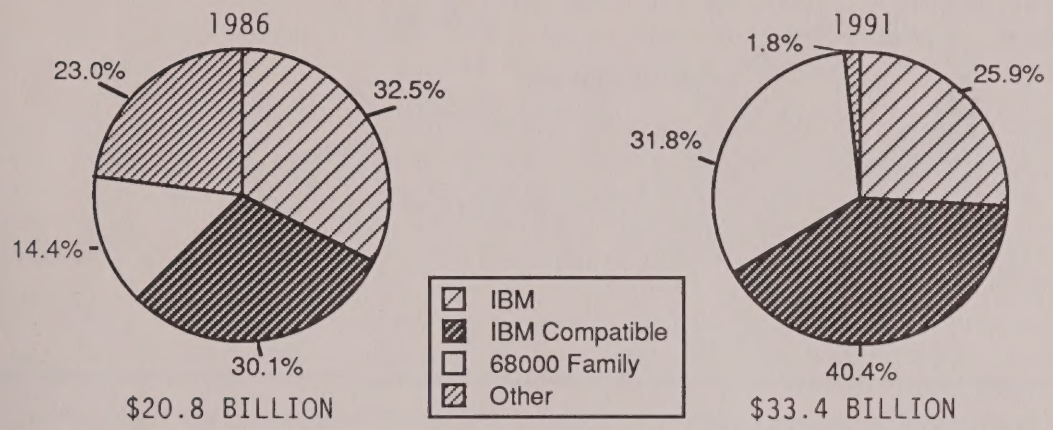

In the long run, the PS/2 architecture will supplant current PCs in many environments, but what IBM intends to do with the PS/2's IBM-designed features to hamper the compatibles is still unclear -- kept that way, let it be noted, by IBM itself, whether out of Machiavellian design or internal confusion. Mixed signals have been sent out about the PS/2's proprietary features, with some spokesfolks promising essentially open licensing of the Micro Channel, and others dropping dark hints about the laws on intellectual property. Compaq has been in the forefront of the compatible counterattack on the PS/2, but one way to read the unwonted sarcasm at the expense of IBM on Compaq's part is that for the first time Rod Canion and company are running scared.

The Gray Sheet recently spoke with some of the people at Chips & Technologies, who are working on PS/2 chip sets even as they hedge their bets with other product plans. Chips & Technologies has not found the new PS/2s as fast as IBM claims, but notes four aspects that currently give IBM an edge:

- The PS/2 is actually designed like a grown-up computer system, and isn't just an empty box with boards. This in itself will add months to the cloning process.

- The Micro Channel is specified in all respects (e.g., for future microprocessor speeds), unlike the AT-bus.

- The PS/2 offers a multi-master processor mode, where different processors needn't forfeit performance in a master-slave relationship.

- Disk Memory Access is five times faster than on previous IBM PCs.

There will be PS/2 clones, of one sort or another; but how close they are to IBM's models in function and performance remains to be seen.

OS/2. Less need be said about OS/2 because less can be until it exists. Interest is strong among users to standardize on OS/2, even if PCs without an 80286 are effectively excluded; so strong, in fact, that Compaq felt compelled to call a conference to remind users that OS/2 is not synonymous with PS/2. But it won't ship until early next year, and the Presentation Manager won't follow until some months afterward. And as for IBM's Extended Version. . . .

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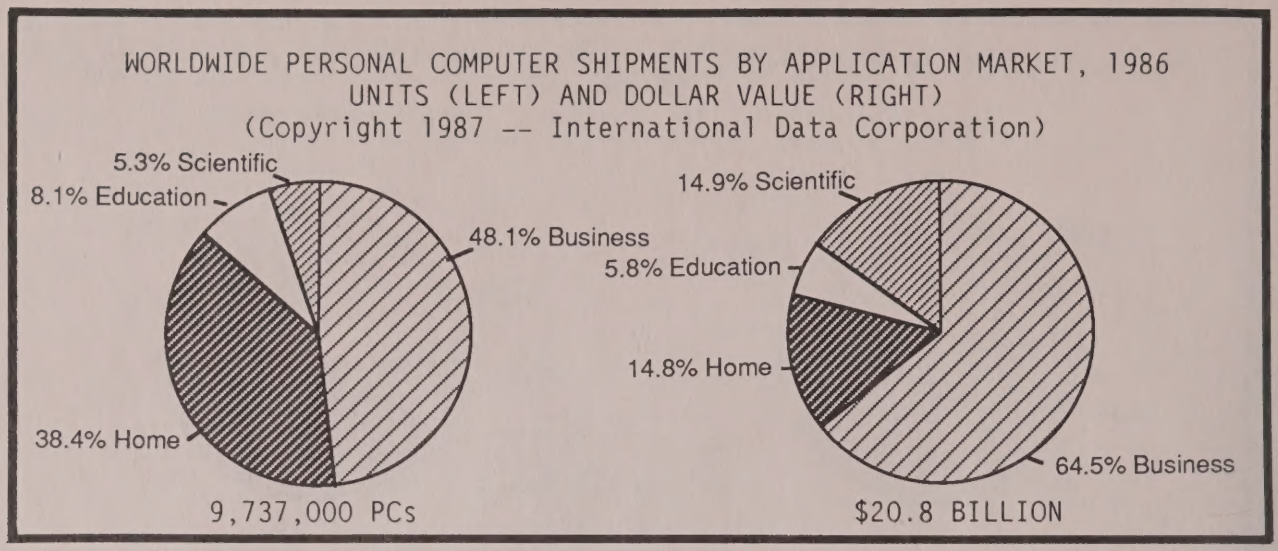

One potential problem is that, with OS/2 arriving in stages, some applications could wind up seeing more ports than the Flying Dutchman. Only software vendors with deep pockets in their iron pants could afford in rapid succession to offer the same application for vanilla OS/2, for windowing/multitasking with the Presentation Manager, and for SAA links to IBM's multiuser operating systems with the proprietary Extended Version of OS/2.

Beyond the Big Blue Horizon. Most of the strong PC vendors in 1987 could attribute their growth to DOS-compatible PCs. HP had an extra advantage in hardware shipment value, since it supplied the laser printers most typically used in conjunction with IBM-compatible machines. Even Digital had to recognize the dominance of the IBM standard in the PC arena.

But one company continues to offer an alternative standard that is becoming to PCs what the VAX architecture is to multiuser systems: the choice of a new generation. In 1986, IDC estimates that the worldwide value of Apple shipments grew some 23% to almost $2.2 billion, or about a third of the value of IBM PC shipments. Its market share rose from 9% to over 10%.

The chief reason is that Mac has finally gone corporate. A third of the sample in a recent IDC survey of sites with 100+ PCs had Apple as well as IBM or compatible PCs, while 6% were Apple-to-the-core shops. Half of the Apple sites were educational institutions -- but 45% were business/commercial.

What got the Mac's foot in the door was the LaserWriter, particularly in tandem with the Mac Plus. But once in, the Macintosh interface and strong software offerings like Excel have broadened Apple's appeal. The 100+ PC survey by IDC's PC people indicates strong buying intentions by Apple owners. Particularly attractive is the new Macintosh SE model.

The Mac SE and MAC II symbolize an intriguing role reversal. Apple has finally "opened" up its new personal computers with expansion slots, and even unscrewed a Mac II to give the Gray Sheet a guided tour through its innards. This at a time when IBM is apparently trying to make its PCs less open, and once the Presentation Manager is available will offer a Mac-like interface.

Apple's success offers a lesson for compatible manufacturers suffering PS/2 envy. All you have to do is create a technologically superior personal computer, find new uses for it, and market the hell out of it. That's all.

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IBM'S BASTILLE DAY: NOT REVOLTING, BUT NOT REVOLUTIONARY EITHER

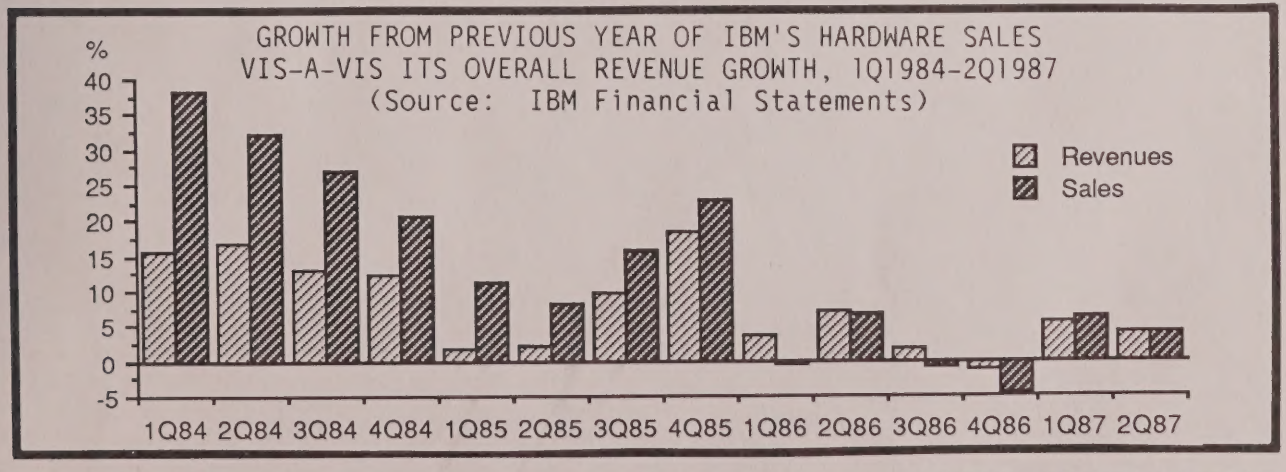
An IBM bull just keeps charging at any movement. Although the second quarter didn't turn out as well as many Wall Street analysts were predicting, the ones willing to be quoted after IBM's July 14 announcement of its most recent financial results professed to find the company's forward momentum adequate.

On their side are a couple of strong points about IBM in 1987. First off, although sales and overall revenue are up only modestly for the first six months of the year (5.0% and 4.8% respectively) and income is down 15.5%, the product cycles will indeed be stronger in the second half. The PS/2 will pick up the 80386-based members of the family, and 9370s will be shipping in volume.

Moreover, although sales were up only 4.0% over the second quarter of 1986, that was the only three-month period last year that saw more money from hardware sales than in 1985. Growth of 6.6% was registered in 2Q1986, while sales in every other quarter were down at least marginally. Consequently, the growth in revenue for the most recent quarter of 4.3% doesn't look impressive next to the 5.5% growth in the first quarter of 1987, but the comparison points have to be taken into consideration. Revenue growth in 1986's second quarter was 7.3%, almost twice the rate achieved in last year's first quarter.

On the other hand, the numbers were below expectations. After all, IBM has been boasting about the acceptance of its 8088- and 80286-based PS/2 models that were generally shipping for the entire period (only the Model 60 version with a 70MB disk was scheduled for availability later in the quarter), the midlife kicker 3090-E models shipped for two thirds of the quarter, and there were at least initial deliveries of 9370s and the new 3090-300E and 600E. While it's true that IBM's PC revenue for the quarter would have been adversely affected by its decision to kill or keep in short supply most pre-PS/2 models, growth of only 4% in sales also suggests that the weak mainframe transition and IBM's midrange malaise are continuing to drag overall performance down.

And then there is the continuing windfall from international sales due to the weak dollar. IBM's own estimates of the effect of currency translation indicate that for the quarter it gained 7% in revenue and nearly 11% in earnings from what it would have made if the dollar were at 2Q1986 levels. Without that increment, revenue would have been down 2.5% rather than up 4.3%, and earnings would have been down 18.5% rather than down 9.8%. For the year to date, without currency translation IBM's revenue would be down 1.9% rather than up 4.8%, and earnings would be down 24.5% rather than down 15.5%.



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• QUIET SOVIET SUBMARINES LEAD TO CORPORATE HARA-KIRI IN JAPAN. The two top figures at Toshiba resigned after the revelation that a member of its industrial group had sold the Russians technology that allowed submarines to better evade radar detection. Congress has been considering legislation that would for a time bar Americans from purchasing Toshiba products, which in certain cases (notably portable PCs) were already effectively excluded by prohibitive tariffs levied in the wake of the chip war. Toshiba's best hope is the Reagan administration's desire to get a bigger commitment from Japan on defense issues, a project that could be hurt by slamdunking Toshiba imports.

• DATA GENERAL TRIES TO REGROUP. Facing what would have been a quarterly loss of $11.3 million on a 3.6% decline in revenue (7.7% down in equipment sales), DG took an additional charge of $53.8 million for restructuring, including closing three major facilities and lopping off about 950 jobs, that it hopes will lower costs by about $100 million a year. Rather than competing head-on with the likes of Digital and IBM in corporate accounts, the emphasis will now be on selected vertical markets and a renewed commitment to DG's VAR base. The cost reduction program should help the bottom line for the remainder of the year, but a turnaround in equipment sales will be much more difficult.

• 3COM'S BRIDGE OVER TROUBLED WATERS. After a long, sometimes clumsy search for the right merger partner, 3COM has finally hit on Bridge, which becomes a wholly owned subsidiary in a stock exchange. The statement by Bridge's William Carrico is worth quoting: "The merger was sought by both companies as an advance-guard move to choose our partners in the inevitable consolidation that will occur in the computer and communication industry."

• IBM'S SOFTWARE FOCUS POCUS. In its effort to address vertical markets more directly, IBM has split an Application Systems Division (ASD) from the IBM Information Services group. The new division will be responsible for developing application software at eleven laboratories worldwide and for acquiring programs from independent vendors, as well as serving as a contact with third-party vendors (colleagues and competitors alike) on issues like SAA. The operative word in IBM's explanations has been "focus," since previously no organization had worldwide responsibility for the plethora of sometimes uncompetitive application programs. ASD could improve IBM's marketing vis-a-vis Digital by allowing tighter integration of hardware and software pitches, put the squeeze on independent software vendors who do not have alliances with IBM, and string some new worry beads for VARs.

• RAISING THE WORKSTATION ANTE AGAIN. As expected, Silicon Graphics introduced a CPU upgrade (12.5 MHz RISC-based microprocessor plus tightly-coupled 12.5 MHz floating point coprocessor) to its IRIS 4D/60 Superworkstation that reportedly bring it to 10 Dhrystone MIPS. Both of SGI's leading OEM partners, Prime and Control Data, have announced versions of the new workstation.

• DIGITAL REVENUE SWITCHES. The eagle-eyed may have noticed that in financial reports Digital has switched from "Equipment Sales" to "Product Sales," and that historical numbers no longer match. Digital explains that it now includes software in the sales column, and takes a chunk off the top of hardware sales and transfers it to "Service and Other Revenues" to make up for the revenue lost to the service group due to one-year warranties.

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THE GRAY SHEET
Computer Industry
REPORT

INTERNATIONAL DATA CORP.

D.C.BELLOMY, EDITOR May 21, 1987 • VOL.23, NO. 1 P.J.MCGOVERN, PUBLISHER

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NEW S/370 ANNOUNCEMENTS UNDERSCORE IBM RECOVERY STRATEGY

The cognescenti of both printed word and processed data have recently been suffering from cognitive dissonance. At least two books about IBM appeared last year. The IBM Way: Insights into the World's Most Successful Marketing Organization was word-processed under the direction of F.G. "Buck" Rodgers, the self-proclaimed "born-and-bred, dyed-in-the-wool IBMer" who retired in 1984 as vice-president of marketing. At the other extreme, Big Blue: IBM's Use and Abuse of Power claimed to tell "the truth about IBM's success and the ominous implications of its stranglehold on the Information Society." It was transferred from note cards by Richard T. DeLamarter, a member of the Justice Department team marooned after the IBM antitrust suit was sunk.

The discrepancies between the two books' tone and attitude would not have surprised many readers, for the authors symbolized a long-standing dichotomy in Big Blue's image. Readers might have wondered, though, whether either description was applicable to IBM in 1986. While IBM was in no-growth mode last year, IDC estimates that the value of Digital shipments grew nearly 17% and constituted 8% of the worldwide market for U.S.-based vendors.

But when all is said and done, both Rodgers and DeLamarter have a point. Whatever its weaknesses, IBM is still the most significant force in commercial processing, with a market share consistently in the vicinity of 40% and nearly five times the value of Digital's computer hardware shipments last year. And it got that way and stays that way because it knows how to market its wares.

Witness the May 19 announcement of new S/370 hardware and software:

- For the single-architecture groupie attracted by the VAX siren song, IBM now claims that the S/370 family has a 160-fold growth path.
- Four replacement models of the 4381s helped rationalize that growth path by bridging the performance gap with 3090s, while opening a wider high-end gap between 4381s and 9370s. A new uniprocessor 3090 bowed with a lower performance point than the new high-end 4381.
- Software announcements spotlighted MVS-XA, with graduated pricing for selected programs, including DB2, and other migration lures for the recalcitrant DOS/VSE user who still balks at moving up.
- The DB2 and SQL interfaces for the Systems Application Architecture were delineated to begin beating the vaporware rap.
- IBM took steps to get sales moving better in weak spots, including buy-it-before-it's-here-and-pay-less and deferred payment plans.

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COMPARISON OF OLD AND NEW 4381 MODELS, MAY 1987

MODEL:	MG11	MG21	MG12	MG22	MG13	MG23	MG14	MG24
Processors	1	1	1	1	1	1	2	2
MIPS*	1.5	2.0	2.8	2.8	3.7	4.6	6.2	8.3
Memory (MB)	4,8, 16	8,16	8,16, 24,32	16,32	8,16, 24,32	16,32, 48,64	16,24 32	16,32, 48,64
Channels	6	6	6	6	6	6	12	12
Channels, Opt.	6	6	6	6	6	6	6	6,12
Cycle Time ns.	68	68	68	68	56	52	56	52
Buffer Strg (KB)	4	8	32	32	64	64	2-64	2-64
Availability	2Q86	1Q88	2Q86	1Q88	2Q86	1Q88	2Q86	1Q88
Old Price**	$275K		$390K		$500K		$735K	
New Price**	$235K	$265K	$340K	$350K	$445K	$530K	$680K	$890K

*MIPS are a conversion factor based on the median commercial performance as described by IBM rather than an independent benchmark measurement.
**Base price held constant for a 16MB configuration, does not include $2.7K in system prerequisites. Old 4381 prices prior to May 19 price cuts.

Trying to Make Superminis Super Again

As orders accumulate for the 9370s (IBM rattled off some of its biggest wins, like 15,000 for Ford dealerships and offices), the new baby S/370s have the task of competing most directly with IBM's midrange rivals, Digital in particular. The selling points will be S/370 compatibility (even if the absence of MVS/XA on lower-grade 9370s does diminish the 1-to-160 performance range claim) and very aggressive (for IBM) price/performance.

To strengthen its midrange profile, though, IBM needed to provide its air-cooled customers with someplace else to go before pushing them into the water-cooled Sierras. It therefore announced that its year-old second-generation 4381 family would be replaced by a new set of machines scheduled to ship in the first quarter of next year. Another ten will be added to the model numbers on the outside of the old cabinets, and some changes will be made underneath. Upgrades from existing models will be available at the same time, while intra-20 series upgrades will follow in 2Q. For users still within the single-digit generation, the Model 1 can go to the 22, the 2 to the 23, and the 3 to the 24.

Steve Schwartz of the Systems Product Division put on the hard sell at the teleconference for consultants, which are normally staid and stolid events. "The reports of the 4381's death are greatly exaggerated." "We have built the future into our products." "There's a whole lot of shaking goin' on."

Hyperbole aside, the 4381-Incarnation III is up to three times faster than its original 1983 speed, and has twice as many channels and up to four times as much memory. The comparison to the second generation is less dramatic, with performance increases from zero (Model 12 to 22, which are essentially the same system) to 34% (Model 14 to 24). The use of 1Mb memory chips in all new models and a 4ns boost in cycle time in the 23 and 24 provide the nudge.

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Customers who order new 4381 models between May 19 and November 30 will first receive an 11, 12, 13, or 14 before December 31, which will then be converted to the new model when available. If they bite, they get a special price for boosting IBM's 1987 sales. For example, someone ordering a Model 24 today would get a 14 for $615,000, a 10% savings even after list prices on current models were cut on May 19. When the 14 got field-upgraded next year, the user would pay $200,000. The savings for customers who buy the new 4381 20 series models before the shipment date would range from $20,000 to $75,000.

One truth demonstrated by the new 4381s is that, with changes to technology and the market, the effective life of a supermini is shortening. Digital's VAX 8XXX line is also in its third iteration, counting from the original 8600 announced two and a half years ago, the VAXBI systems inaugurated last year, and the refurbished lower-level 8XXXs introduced on March 4. IBM needed to revamp its 4381 offerings, especially since sub-7 MIPS ratings placed them well below the high-end medium-scale offerings of just about everyone else.

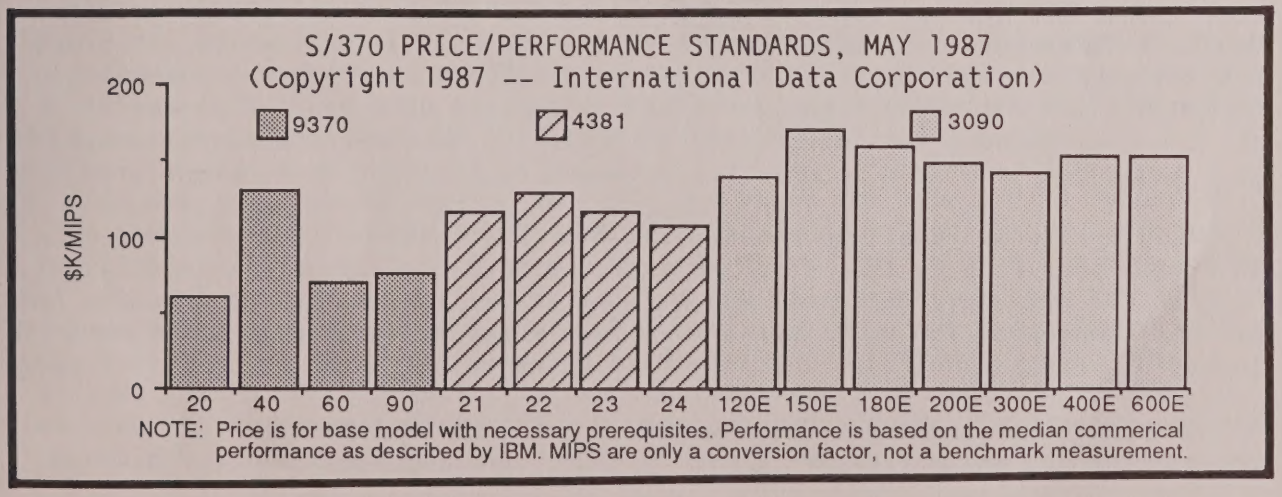
The 3090-120E: Son of CX?

The announcement of a new entry-point 3090, the 120E, in conjunction with the new 4381s conjured memories of the 3083-CX, which appeared on the same day in October 1984 that the 4381-3 was unveiled. Like the CX, the 120E is a detuned uniprocessor that apparently rounds out the base models in an IBM mainframe generation. And just as the CX came in at a lower performance and worse price/performance point than the 4381-3, the 3090-120E is rated below the 4381-24 in processing power (7.4 vs. 8.3 MIPS, with the usual caveats) but lags in price/performance ($140K/MIPS vs. $108K for base models with prereqs).

The issue then is whether the 120E will look all too much like the CX. IDC estimates that there were only 260 3083-CXs installed worldwide on January 1, 1987. What are the chances that the 120E can sell any better?

IBM seems aware of the problem. For one thing, because of how it is priced against the 150E, the price/performance disparity between the 120E and 4381-2Xs is not as sharp as it could have been. In fact, 120E price/performance falls almost exactly in the middle between a 4381-24 and a 3090-150E.

Moreover, the 120E is the first 3090 to be placed in Group 30 for graduated software pricing. The idea was probably to keep 120E software prices under the lower cost-of-ownership umbrella for 4381s, which are mostly also Group 30.



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There are also indications that IBM will try to focus 120E marketing. The new Sierra, IBM claims, yokes general purpose computing to superior "scientific batch work, technical data management, graphics, and interactive processing." Its vector performance is superior to the scalar, unlike a 150E, where they are exactly even, and it offers a new entry point for the Vector Facility (VF).

Finally, IBM is offering a six-month deferred payment program for the 120E and 150E at new Sierra sites to stimulate sales for the uniprocessors.

Nevertheless, it is hard to see how a lower-performance 3090 can do much better than the poorly selling 150, and the dismal track record to date of the VF suggests that the scientific/engineering community is not lusting after IBM mainframe solutions. Also, the Group 30 software pricing could hurt when users add up the actual cost of ownership, since if they want to grow to higher-performance 3090s from a 120E they would have to make up the difference between Group 30 and Group 40 pricing on all the software they'd bought on one-time charges. The Gray Sheet's view is that the 120E is as superfluous and could prove as uneventful a product for IBM as the 3083-CX was.

Software Baits the Hook

During the teleconference an IBM exec noted that the company has announced 700 new products over the past year, and that 70% of them were software. This is as it must be, not only because software and services have recently been the only high-growth areas for IBM, but also because the software base is above all what keeps users buying blue; it is what must lure users to purchase more expensive IBM hardware; and it is what is at the crux of the compatibility issue for IBM, for even on an ostensibly consistent architecture like S/370, there are now three incompatible operating systems (MVS, VM, and DOS/VSE).

Some of IBM's May 19 announcements seem designed to prod DOS users finally to move up to MVS. A VSE/MVS SolutionPac has been created to assist in the migration, a DB2/VSAM Transparency product allows users to operate their old VSAM applications on data in IBM's MVS DBMS, and the shift of a number of major MVS/XA products to IBM's graduated pricing schedule cushions the financial burden of migrating for many users. For example, the Data Facility Product (DFP) and DB2 cost only 62.5% of their mainframe pricing on Group 20 and 30 systems.

Enhancements were introduced to both DFP and DB2, and in general to the DCMS and DBMS families to which they belong. Storage management will be facilitated with new releases of Data Facility Data Set Services (DFPSS) and Data Facility Hierarchical Storage Manager (DFHSM) as well as DFP, while IBM braced DB2 and SQL/DS with a Database Application Directory for both environments (DBRAD/MVS and DBRAD/VM). Engaging the independent DBMS vendors on one of their strong points, the integration of tools for database administration, IBM also announced its first SolutionPac Database Application Development products.

And it stressed that the new Release 3 of DB2 conforms to the common SQL interface specified by SAA, which as expected more closely parallels ANSI SQL. Even if all DOS users migrated, and even after the integration of the S/36 and S/38 is completed, IBM would still have four separate environments (MVS and VM in S/370, S/3X, and OS/2). That's why it needs to get users to believe in SAA.

Okay, IBM still doesn't "have it now," and learned late what "it" is. But you can bet its sales reps are going to start learning the tune to "Tomorrow."

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IBM VS. DIGITAL EQUIPMENT SHARES OF THE WORLDWIDE MEDIUM-SCALE SYSTEMS MARKET FROM U.S.-BASED VENDORS
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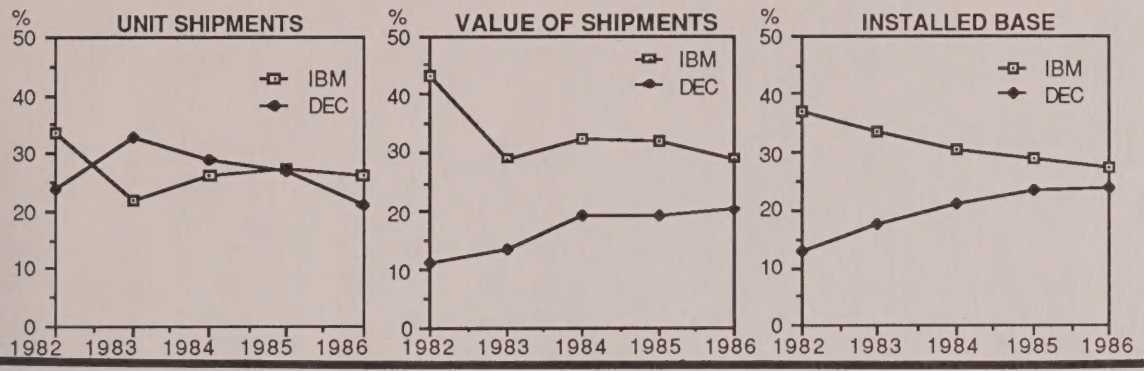

THE FIRST QUARTER QUESTION: DOES ONE SWALLOW A SUMMER MAKE?

John Young made it official. The Gray Sheet could gingerly suggest it on the basis of early 1Q returns (Vol. 22, No. 24, April 17, 1987), the press could start blaring it in headlines, but it required blessing from a respected industry figure like the president/CEO of Hewlett-Packard. HP's strong quarter, Young opined, resulted from its favorable product cycle and "a rebound in the computer industry." Of course, Young had some lead time, since HP's quarter ended April 30, a month after most other vendors closed their books.

The Gray Sheet started publishing quarterly financial updates as the Great Softness settled in two years ago. To give a more comprehensive vista, this year we are doubling the number of vendors covered and dividing them up as logically as possible between industry segments. Any comments would be welcome.

As usual, there are a number of compelling individual stories in the figures. Two astounding growth curves finally reaped their reward: Sun's revenue surpassed Apollo's for the first time, and Microsoft overtook Lotus for the premier position among PC software vendors. Less predictably, all semiconductor/components vendors showed good growth. Still on the sunny side of the street, Wang and Control Data reported profits. Others, though, like Data General and Convergent Tech haven't crossed over, at least not yet.

But the best news lies in the aggregate figures: computer systems vendors, up 8% in revenue (with 1986 Sperry results included); peripherals and communications, up 34%; software/services/VARs, up 22%; semiconductors/components, up 18%; the industry sample as a whole, up 10%. Without IBM, the computer systems segment would have been up 10% in revenue and 74% in income, and the sample as a whole up 13% in revenue and almost double in income. And IBM has its own reasons for finding hope in 1Q results (see the April 17 issue).

So does this means that folks are right about the rebound? It would be nice to think so, but two big caveats remain. One is that the U.S. economy as a whole is still not running on all cylinders, and the other is that too much of the growth still depends on currency conversion from foreign sales. The Japanese yen and the ECU (the European basket currency) were both up 21-22% against the U.S. dollar on a weekly average basis in 1Q1987 over 1Q1986. Because this trend is continuing, second quarter results should continue to show strong international growth. A wise rebound, though, builds its house on the rock of strong demand, not on the sands of currency differentials.

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SELECTED INFORMATION INDUSTRY FINANCIAL RESULTS, FIRST QUARTER 1987*
(Source: Company Financial Reports)

Category/ Company	1Q/87 Rev.	1Q/86 Rev.	% Change	1Q/87 Earn.	Q1/86 Earn.	% Change
Computer Systems						
Alliant	12.0	4.0	199.4%	2.5	0.5	427.0%
Altos*	40.4	37.7	7.2%	2.8	3.1	(9.7%)
Amdahl	318.5	200.2	59.1%	25.2	2.4	943.2%
Apollo	123.4	82.0	50.5%	6.4	0.5	1092.9%
Apple	575.3	408.9	40.7%	33.9	31.8	6.5%
Compaq	211.0	144.0	46.5%	20.2	8.3	142.0%
Computer Consoles	35.6	21.2	67.9%	0.8	(5.6)	NA
Control Data	821.7	796.1	3.2%	7.2	(21.2)	NA
Convergent Tech	73.6	89.5	(17.8%)	(11.0)	2.1	NA
Convex	14.4	7.5	92.0%	2.1	0.5	294.8%
Cray	214.1	142.0	50.8%	57.2	30.9	85.3%
Data General*	315.2	318.8	(1.1%)	(42.6)	(1.8)	NA
Digital	2410.1	1928.3	25.0%	307.6	170.3	80.6%
Gould	227.6	228.3	(0.3%)	7.6	(115.1)	NA
Harris	522.3	517.3	1.0%	21.9	15.3	43.3%
Hewlett Packard*	2017.0	1778.0	13.4%	162.0	127.0	27.6%
IBM	10681.0	10127.0	5.5%	785.0	1017.0	(22.8%)
Kaypro	28.9	20.4	41.2%	0.9	0.8	8.1%
MAI Basic Four	78.1	70.8	10.3%	5.4	4.1	33.0%
Masscomp	20.3	14.1	44.0%	1.6	0.6	179.9%
NBI	69.2	67.6	2.4%	(0.9)	(2.4)	NA
NCR	1121.5	960.8	16.7%	61.5	50.2	22.5%
Prime	221.7	196.8	12.6%	11.9	9.3	28.4%
Pyramid	12.6	11.1	13.6%	0.4	0.9	(50.6%)
Silicon Graphics	22.6	10.5	115.6%	2.9	0.4	571.8%
Sperry		1801.1	NA		115.3	NA
Stratus	37.4	26.9	39.0%	3.7	3.1	21.5%
Sun Microsystems	141.7	57.6	146.1%	10.2	3.4	201.0%
Tandem	242.4	176.3	37.5%	22.4	12.4	80.9%
Tandy	776.9	693.4	12.0%	50.4	42.0	19.8%
Unisys	2415.8	1136.0	112.7%	110.2	16.0	588.8%
Wang	745.9	685.3	8.8%	5.9	5.3	12.4%
Subtotal	24548.2	22759.6	7.9%	1675.2	1527.4	9.7%

*Altos 1Q1986 revenue excluding net gain of $11.4M from sale of Wyse Technology investment; DG 1Q87 earnings include one-time losses from writing down assets of unconsolidated affiliate; HP for quarter ending 4/30/87.

Peripherals and Communications						
Alloy	10.8	10.0	8.1%	0.8	0.6	22.7%
AST Research	55.4	41.5	33.5%	3.4	6.4	(47.6%)
Bridge	15.3	9.2	66.2%	1.6	1.0	60.7%
Britton Lee	5.7	7.2	(21.5%)	(2.0)	0.2	NA
Cipher Data	46.0	40.2	14.3%	1.3	1.7	(24.8%)
Dataproducts	84.9	96.9	(12.4%)	1.7	5.5	(69.7%)
Emulex	25.8	27.2	(5.2%)	1.3	2.2	(41.0%)
Irwin Magnetic Sys	14.6	10.2	43.4%	1.2	1.5	(20.2%)
Key Tronic	33.7	35.3	(4.7%)	0.9	1.2	(27.9%)

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Maxtor	53.9	26.5	103.4%	8.0	3.9	105.3%
Micropolis	61.8	50.7	21.9%	6.2	3.8	65.8%
Miniscribe	61.4	40.3	52.2%	6.1	4.7	29.4%
Network Systems	20.3	24.0	(15.4%)	1.1	3.1	(62.9%)
Priam	36.1	36.2	(0.1%)	0.1	2.5	(97.2%)
Quantum	31.9	27.7	15.2%	2.9	6.9	(57.2%)
Rexon	24.2	13.7	76.7%	2.0	0.8	145.4%
Seagate	267.1	127.0	110.3%	40.5	11.8	241.9%
Storage Tek	180.6	161.5	11.9%	14.3	5.0	184.7%
Tandon	80.4	58.2	38.2%	5.1	1.9	163.6%
Ungerman-Bass	31.2	26.1	19.2%	1.2	0.8	48.0%
Western Digital	122.0	76.4	59.6%	12.5	6.8	84.2%
Wyse	77.9	46.3	68.3%	5.1	3.7	40.6%
Xebec	22.6	23.9	(5.4%)	(2.1)	(1.9)	NA
Subtotal	1363.5	1016.2	34.2%	113.3	74.3	52.6%
Software/Services/VARs						
Ask Computer	25.4	17.6	44.3%	1.7	1.4	20.3%
ADP	373.7	324.3	15.2%	39.3	31.9	23.3%
Boole & Babbage	10.0	8.6	15.7%	0.5	0.4	29.9%
Comdisco	276.4	217.6	27.0%	28.5	16.4	74.2%
Computer Associates	102.0	57.7	76.9%	11.2	5.3	111.0%
Computer Sciences	290.5	236.8	22.7%	10.8	8.9	22.2%
Computervision*	139.8	112.9	23.8%	5.8	(7.0)	NA
Cullinet*	43.0	44.6	(3.6%)	(4.9)	3.8	NA
Cybertek	6.4	7.4	(13.3%)	0.3	0.9	(65.2%)
Daisy Systems	23.8	22.5	6.0%	(4.9)	(4.7)	NA
Data I/O	16.7	16.1	4.0%	1.0	1.2	(14.2%)
Informix	7.1	4.2	72.2%	0.8	0.3	130.4%
Intellicorp	5.5	5.4	2.5%	0.1	0.6	(88.7%)
Intergraph	128.5	147.0	(12.6%)	10.0	18.0	(44.4%)
Interleaf	11.8	6.8	72.3%	0.6	0.3	148.8%
Lotus	84.8	69.3	22.4%	13.7	11.4	20.5%
MSA	46.5	29.4	58.1%	(5.2)	(0.4)	NA
Mentor Graphics	50.5	37.1	36.1%	4.2	1.9	119.8%
Microsoft	98.4	50.5	94.8%	19.1	10.6	79.7%
Software Pub.	10.9	5.7	91.0%	1.6	0.4	334.0%
Symbolics	24.6	30.9	(20.2%)	(2.0)	3.5	NA
UCCEL	42.8	34.1	25.6%	5.9	2.5	138.8%
VM Software	6.3	4.3	46.0%	0.8	0.6	22.4%
Subtotal	1825.5	1490.7	22.5%	138.9	108.0	28.5%

*Computervision 1Q Earnings include $4.7 million from sale of Sun stock; Cullinet for quarter ending January 31.

Semiconductors/Components						
AMD	170.1	153.4	10.9%	(3.3)	(19.1)	NA
Chips & Technologies	22.8	4.3	430.8%	3.6	0.8	356.2%
Cypress	15.0	9.7	54.7%	2.7	2.0	37.3%
Intel	394.5	280.1	40.9%	25.5	(22.2)	NA
LSI Logic	55.1	45.4	21.5%	2.1	2.7	(22.6%)
Texas Instruments	1271.9	1145.2	11.1%	83.8	(23.8)	NA
Subtotal	1929.5	1638.0	17.8%	114.4	(59.6)	NA
TOTAL	29666.7	26904.5	10.3%	2041.8	1650.0	23.7%

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• SUPERCOMPUTER SKIRMISHES. Cray finally has some U.S.-based competition again. ETA, CDC's supercomputer division, formally unveiled the first ETA^{10} at Florida State on April 27. Most of the remaining design glitches will supposedly be gradually corrected. The clock speed is 12.5ns today, but 10.5ns is heralded for this summer, and 7ns, the design target, is supposed to come next year (the Cray-2 clock speed is 4.1ns). The operating system today is the CYBER 205's VSOS, with interactive enhancements scheduled for November, then UNIX-V next year, and an NOS/VE interface for CYBER 180s shortly thereafter.

While ETA^{10} is betting on multiprocessing, Honeywell-NEC Supercomputers Inc. (HNSX) is boasting that its SX 2-400 flagship is the world's "most powerful single-processor supercomputer" at 1.3 GFLOPS. Two less potent models (although all three run at 6ns) round out the initial product line of the joint venture in which NEC will supply the supercomputers and Honeywell (not Honeywell Bull) will supply North American marketing expertise.

• WORKSTATION WARS. Apollo entered the 3-D dynamic graphics arena with the DN590 Turbo. Then HP weighed in with its first Precision Architecture workstation, the 825SRX, which replaces its 350SRX as its 3-D headliner. IDC's Technical Computing Program expects a response from Silicon Graphics this summer.

• ADDING MORE COLORS TO HP'S SPECTRUM. The 825SRX workstation is one of three new HP 9000 Precision Architecture products announced. The 840S will be bracketed by an entry-level 825S system (2-24 active users) and a high-end 850S (50-89 active users). HP also noted that, since no major bugs have appeared in two months of beta-testing, the 3000 Series 930 is still scheduled for August shipment, and the company will start to accept orders for the 950, due to ship in 4Q1988. The 930's price tag now reads $180K, a 20% cut due to changes in price/performance standards since its announcement 15 months ago.

• MULTIUSER 80386 HERD INSTINCT. The first three vendors (with more to follow) have introduced multiuser Unix systems based on Intel's 386 chip. Going to Intel is not new for TI, but it represents a shift from National for Sequent and a departure from proprietary architectures for Prime.

• VERTIGINOUS FAULT TOLERANCE. At one end, Tandem is introducing two distinct entry-points to its fault-tolerant superminis, a Unix box from Altos with disk mirroring and a proprietary LXN that includes Tandem's first single-CPU proprietary system. At the other end, Tandem is taking a cue from Digital and packaging as mainframes four VLX configurations with special numbers.

• SUN IN THE STRATUS SPHERE. Stratus and Sun have signed a joint development/cooperative marketing agreement to implement an NFS interface between Stratus fault-tolerant systems and Sun workstations.

• FORTUNE'S FALL. Fortune Systems has been integrated with the computer division of SCI Systems, Inc. The plan is to continue for now Fortune's 68020 line alongside SCI's 80286/386 Unix systems, but eventually to combine them.

• ZENITH AND THE FLAT MASK SOCIETY. Zenith's ZCM-1490 14" Flat Technology Monitor claims a number of improvements over conventional curved-shadow-mask CRTs, including a 50% increment in brightness, a 70% gain in contrast, and virtually complete freedom from glare and reflection, for $999.

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THE GRAY SHEET
Computer Industry
REPORT

D.C.BELLOMY, EDITOR April 17, 1987 • VOL.22, NO.24 P.J.MCGOVERN, PUBLISHER

IBM'S NEW PC SONG: "P.S., I LOVE YOU"

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Let's put this into perspective. Newsletters in the industry-watching business probably shouldn't admit this, but five years ago, a period already deep in "the dark backward and abysm of time," the Gray Sheet -- and everyone else we know of -- would not have predicted that a PC announcement from IBM would be awaited with bated breath by the entire vendor and user community.

The fact is, the possibility of significant change in what was in 1986 a $14.2 billion market in the U.S. alone ($9.6 billion for IBM-compatible PCs) has important implications not just for the industry, but for the economy. Corporate customers must evaluate the effect on how they currently use PCs and multiuser systems; competitors of every stripe must determine the impact on their current offerings and future plans; channels of distribution must decide the new mix of products they will stock; peripheral and add-on manufacturers must assess the consequences for their products; software vendors must divine and develop the applications that could best take advantage of the new hardware; and investors must appraise the ability of not just IBM, but all the other vendors as well, to answer the key questions raised by the new PCs:

What will the corporate desktop look like for the next five years? And what will be going on there?

With so much depending on the technical genius, marketing intuition, and buying decisions of so many different people, no hard-and-fast answers are as yet possible, but some tentative generalizations about the probable impact of IBM's April 2 announcements on the PC market are possible:

- By opting against a direct confrontation with the most price-sensitive, near-commodity clones, IBM has created two standards that effectively segment the market between the corporate sell and the individual purchase, with smallish businesses falling in between.

- IBM and its competitors with the greatest technical expertise and deepest pockets will cluster in the corporate market and skim off the top of the individual/small business market, leaving the remaining MS-DOS clones to scramble for slim margins on cheaper boxes.

- A similar division could occur in packaged software. Only the largest, most established vendors, plus startups with exceedingly elegant solutions, may be able to succeed with applications running only on PCs that will necessarily have a much lower sales volume.

- A new generation of add-in boards, and possibly vendors, will appear to take advantage of IBM's new Micro Channel architecture.

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What's New From Big Blue

A wider perspective is necessary because of the vague note of ennui that could be detected in some of the responses to IBM's Personal System/2 and attendant products. Yes, the new PCs are pretty much what industry scuttlebutt has predicted, but IBM had nothing to gain by proving everybody wrong. Yes, they're not cheap, but who in Anno Domini 1987 (or any other year, for that matter) should be surprised at that from IBM? Yes, it will take a couple of years before all the pieces are in place, but when has it been otherwise with new PCs (witness the original PC and the AT, as well as Apple's Macintosh)? No, they won't kill off the clones, but hasn't IBM been telling us for over a year that it wouldn't get involved in a commodity market?

The bottom line is that only one vendor has been in a position to refashion PC architecture to take optimum advantage of technological advances. Even Compaq had to settle for making its Deskpro 386 simply a superfast AT, since it couldn't afford to run too far in advance of the IBM standard. And it is the challenge of making a more mature PC that, by and large, the PS/2 meets:

- Through custom VLSI chips and tighter packaging new heights of integration are achieved, with many features that used to require expansion cards now built in. System setup switches are no longer necessary, while much more RAM is available for the higher-end models.

- Graphics are enhanced with MultiColor Graphics Array (MCGA) on the main circuit board of the entry-level PS/2, and the new Video Graphics Array (VGA) built into the three higher-end models. VGA doesn't yet match Macintosh graphics, but at least (at last) allows IBM to start playing in the same ballpark.

- IBM has finally dropped the other shoe by embracing the 3.5" diskette standard for the new systems. The 20MB hard disks for the lower-end models are also in the 3.5" form factor.

- On the higher-level models, IBM's proprietary Micro Channel supersedes the 8- or 16-bit bus architecture on previous PCs with 16- and 32-bit data paths. Application throughput can also be increased due to the higher number of DASD units (up to 15, with a degree of concurrent usage) that can be supported by the Micro Channel.

- Also only for higher-level PS/2 models, IBM and Microsoft co-announced the schedule for the next generation of DOS, yclept Operating System/2 with Presentation Manager (a.k.a. Windows).

Unlike any version of MS-DOS, including 3.3 introduced with the PS/2, OS/2 will incorporate multitasking, use hardware rather than software interrupts, obey 286 segment rules, and allow for up to 16MB of memory rather than 640KB. Consequently, while OS/2 will run most earlier DOS programs, MS-DOS PCs won't run programs designed for OS/2. Under current plans, a software development kit will be available for OS/2 in August and for the presentation manager in November. OEMs can supposedly get the OS/2 kernel in December.

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IBM AND COMPATIBLE PROPORTION OF WORLDWIDE UNIT SHIPMENTS OF PC'S
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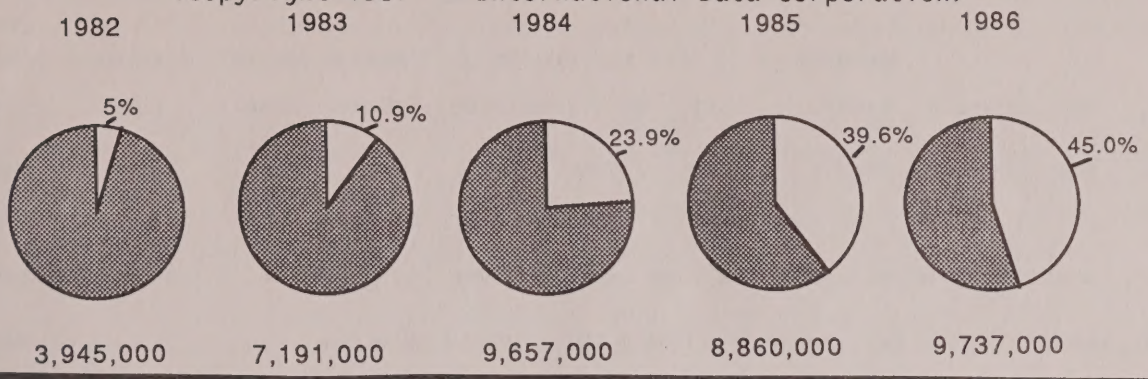

Both IBM and Microsoft promise that OS/2 will be available in 1Q1988. However, IBM has been stung before by Bill Gates' development team (after all, it had hoped for many OS/2 capabilities, notably multitasking, for the AT). For right now it is just talking about a schedule for vanilla OS/2; it won't announce availability for the presentation manager until the fourth quarter.

Gates won a reprieve from the rampant speculation that IBM's new PC generation would include a proprietary operating system. However, IBM will produce an "extended edition" of OS/2 for corporate users incorporating an SQL RDBMS and a communications manager with built-in Token Ring, LU 6.2, 3270/3101/VT100 emulation, etc. When IBM says that OS/2 participates in SAA, it seems to mean mostly the "extended version." Availability will be announced in 4Q1987.

The Boxes. The stepchild in the PS/2 family is the Model 30, which does not include Micro Channel architecture, VGA support, or the potential to run OS/2. What it has are an 8MHz 8086, a 16-bit data path, and the custom chips that join to allow it to run reputedly at twice the speed of an 8088-based XT, or at an AT pace. Even without VGA, its MCGA graphics subsystem is decent.

It has to be at least adequate, since it's for the 30 that IBM has designed its first SolutionPac for desktop publishing, scheduled for 3Q delivery. Besides a dedicated PS/2-30 it includes the PagePrinter, IBM's first desktop laser printer; a monochrome display; a 68000-based PostScript adapter that resides on an expansion card; plus Aldus's Pagemaker. Aldus has recommended 286-based systems for Pagemaker, but note IBM's performance claims for the 30.

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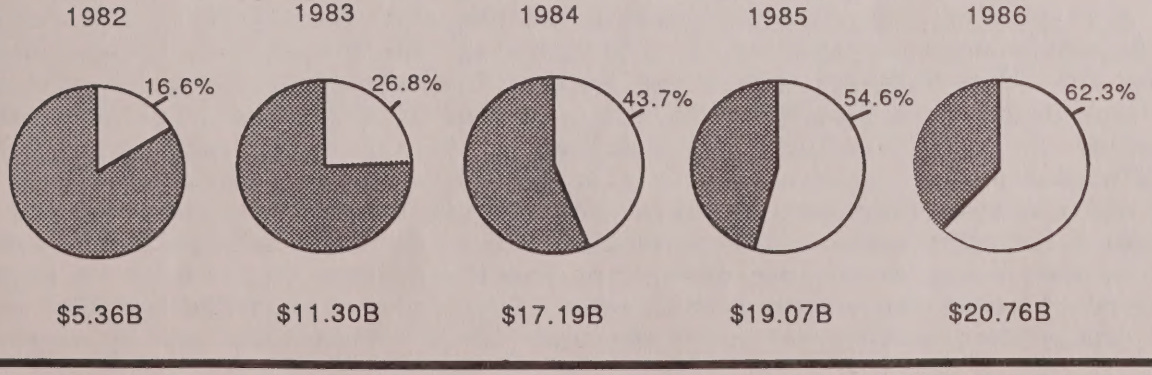

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IBM'S PERSONAL SYSTEM/2 MODELS INTRODUCED APRIL 2, 1987

Model	Use	Processor	Operating System	RAM	3.5" Dsktt	Standard Hard Disk	Expansion Storage*	Micro Chan.	Expan. Slots	Base Price	Avail.
30-002	Desk	8MHz 8086	DOS 3.3	640KB	2 720KB	No	No	No	3 PC/XT	$1,695	Now
30-021	"	"	"	"	1 720KB	3.5"20MB	"	No	"	$2,295	"
50-021	Desk	10MHz 80286	DOS 3.3,OS/2	1MB,to7MB	1.44MB	3.5"20MB	No	Yes	3 16-bit	$3,595	Now
60-041	Floor	10MHz 80286	DOS 3.3,OS/2	1MB,to15MB	1.44MB	5.25"44MB	44MB disk	Yes	7 16-bit	$5,295	Now
60-071	"	"	"	"	"	5.25"70MB	70MB/115MB	"	"	$6,295	2Q87
80-041	Floor	16MHz 80386	DOS 3.3,OS/2	1MB,to16MB	1.44MB	5.25"44MB	44MB disk	Yes	3 32-,4 16-bit	$6,995	Jul87
80-071	"	"	"	2MB,	"	5.25"70MB	70MB/115MB	"	"	$8,495	Jul87
80-111	"	20MHz 80386	"	2MB,	"	5.25"115MB	70MB/115MB	"	"	$10,995	4Q87

*200MB optical disk drive is available as an external option for 30s and 50s, an internal option for 60s and 80s.

Models 50 and 60 are next-generation 80286-based systems; although at 10MHz the clock is running only 25% faster than on ATs, the other enhancements supposedly bring overall performance to about double an AT. The chief difference between the two model groups is that 50s, with 3.5" 20MB hard disks, are designed for the desktop, while 60s have 5.25" disks and are floor-standing. The most important aspect of the 50 and 60, though, is that they are the entry point for Micro Channel architecture, VGA support, and OS/2.

Most of the 30, 50, and 60 models are available now; the same is not true for PS/2-80 models, which are IBM's first PCs based on the 80386 chip. Two versions running at 16MHz will be available in July; a high end clocking in at 20MHz, faster than the other 386 PCs now available, will ship in 4Q1987.

As the significance of SAA and OS/2, especially in IBM's extended version, are explored, the 80s could find a place in corporate environments, but for the immediate future they will probably be more attractive in technical applications like CAD/CAM/CAE. Even here, use could be limited until Unix is available when AIX is ported at some point next year. Overall, it seems that IBM hasn't begun to plumb the technical and marketing opportunities of the 80386.

Also Leaving Their Cards. April 2 was one of those days when IBM showers product-announcement paper as if it's throwing itself a ticker-tape parade. Among the other hardware were a new family of analog displays, three color, one monochrome (black-on-white or white-on-black); a 3.5" external drive (an internal option is available for some models) to allow data exchange with PC/XT/ATs, and a 5.25" external drive allowing PS/2s to use programs designed for the older format where not prohibited by copyright or licensing agreement; a 200MB+ 5.25" WORM optical disk drive, believed by IDC to be supplied by Matsushita, that comes as an internal option for 60s and 80s (a first for a major PC vendor) and as an external option for 30s, 50s, and most XTs and ATs; plus the Pageprinter laser printer and upgrades for the Proprinter and Quietwriter.

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Noteworthy among the software/connectivity announcements were a 3270 adapter card for PS/2s and traditional PCs that, in conjunction with a new software program, provides up to four host and six DOS application sessions; and several new SolutionPacs, including not only the PS/2-30 desktop publishing package but also a VM-based publishing system for 9370s and up.

Winners and Losers. Even if it didn't immediately kill off any clones, the PS/2 announcement will have its effect on some rather notable IBM-compatibles: IBM's own. The eponymous PC is no more, while the future of XT and AT models, on which prices were cut as deep as 35% (the XT-268), now depends on users' acceptance of the PS/2 (in particular their investment in 5.25" programs and their attitude towards the hassle involved in converting to 3.5"), and on the XT and AT's ability to continue attracting enough individual buyers more interested in reputation than in price. For example, it remains to be seen whether there will be further enhancements to the AT line (e.g., a 10MHz version).

Two other PC models had shadows cast on them by the announcements. The net effect of the 3270 announcements (especially the adapter card) is to call into question the need for 3270 PCs. Also, unless the recent enhancements to the RT finally allow it to start paying its way as a technical workstation, IBM could choose to add the floating-point and communications/networking options that would permit the PS/2-80 to supplant rather than just encroach on it.

One area where IBM stands to be a big winner with the new PCs is profit margins due to the extensive vertical integration involved. For example, some 80% of the component parts of the 80s will be waltzing out of IBM's own design labs and factories, including megabit RAM chips and disk drives.

Obviously, though, the corollary is that there are a lot of suppliers out there who will be losers. For example, the only second source for IBM's 20MB drives is rumored to be Miniscribe, which if true would adversely affect Seagate. And with IBM now supplying nearly all of its higher-capacity 5.25" drives, disk vendors may have to specialize in the areas thus far ignored by Big Blue (e.g., half-height Winchesters and tape backup for the PS/2s).

As for the 50-100 IBM-compatible PC vendors active in the U.S., there are a few companies with enough technical expertise to reverse-engineer the seven days of creation if necessary. Some of these will presumably create and sell compatible solutions to the Micro Channel, the most critical proprietary addition to the PS/2 line. However, the biggest winners will be the handful of leading hardware vendors that come up with their own compatible alternatives.

The reason is that only a handful of companies will be able to compete in the smaller-volume, corporate-sell environment for which the PS/2 has been designed. It's not just the proprietary elements, either. Take the OS/2 operating system, which will be available to all other comers from Microsoft -- but the Gates mates recommend at least 1.5MB of RAM for it. Hence PC players wishing to offer OS/2 will need a relatively inexpensive access to megabit chips, which few will have until probably well into 1989.

This returns us to the point we started with. For users, there are now two standards: PC and PS. And for hardware and software vendors, the two standards will increasingly bifurcate the market. For the next couple of years, only a few will be able to play in both parts. Whatever other impact the PS/2 may have, its most notable legacy may be this segmentation of the PC market.

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CHIP WAR BARRAGE PEPPERS THE PORTABLE PC MARKET

On Friday, April 17, a collective "whew" could be heard in the boardrooms of a number of U.S. vendors who faced possible 100% tariffs on Japanese products. Elsewhere, however, white-knuckled hands were groping for the Tums.

Importers of high-end hardware got off scot-free, but their confreres at the low end were not so lucky. The tariffs will fall on 16-bit PCs and above, both desktop and portable. Affected will be U.S. vendors who go to Japanese manufacturers for PC offerings (one example may be Unisys, which imports the [Sperry] IT from Matsushita). But if the duties are levied for any length of time, the greatest impact will likely fall on the laptop portable market.

The portable market in the U.S. has been a niche aimed at automating sales agents and others who have to hit the road individually (e.g., the IRS). In Japan, though, it has drawn a lot more attention due to the footprint issue. With Tokyo office space costing twice as much as in New York City, PCs need to take up as little room as possible. However, the business PC market has typically lagged in Japan, so vendors like to establish a market in the U.S. first and then switch to selling at home with economies of scale firmly in place.

The big winner with this strategy in 1986 was Toshiba, which according to a recent IDC report shipped 30,000 units to the U.S. in 1986 and jumped to number two in the value of its U.S. portable shipments. Particularly popular was the T-3100, an AT-compatible whose compact footprint stole desktop business from Compaq. Toshiba is only now starting to market the T-3100 in Japan.

Where they'll have to stay for now. Compaq can breathe a little easier, while IBM may even succeed in using the Convertible as something more than a chance to practice making small-footprint PCs and to nudge software houses to start offering products in a 3.5" format a year before the PS/2 announcement.

I WONDER WHO'S SUING WHOM NOW

Does "L.A. Law" need script ideas? A recent federal court ruling in Atlanta seemed to bolster Lotus's brief in its suit against Paperback Software and Mosaic Software by affirming the legal protection of a software product's "look and feel." But in the meantime, Adam Osborne, ever the maverick, has been saying that Lotus has a lot of nerve suing his Paperback Software for copying 1-2-3's "look and feel" when all he's done is what Mitch Kapor did to Visicalc.

Visicalc, the pioneering spreadsheet program introduced in 1979, used to be owned by Software Arts, which won a bruising legal battle with VisiCorp (once the employer of Mitch Kapor) over control of the product. The victory proved Pyrrhic, though, when neither side could recover from the years of courtroom bloodletting. Since Lotus bought the rights to Visicalc in 1985, hired its two developers, one of whom is still a Lotus employee, and then killed the product, the point seemed what the courts would call moot.

However, someone at SAPC, the corporate descendant of Software Arts, must have heard Osborne, since it is now suing Lotus and Kapor for $100 million for aping Visicalc's "look and feel" from January 1983, when 1-2-3 was introduced, through completion of Lotus's purchase of the rights to Visicalc in June 1985. No matter the legal or moral rights and wrongs, the talk is of hoisted petards.

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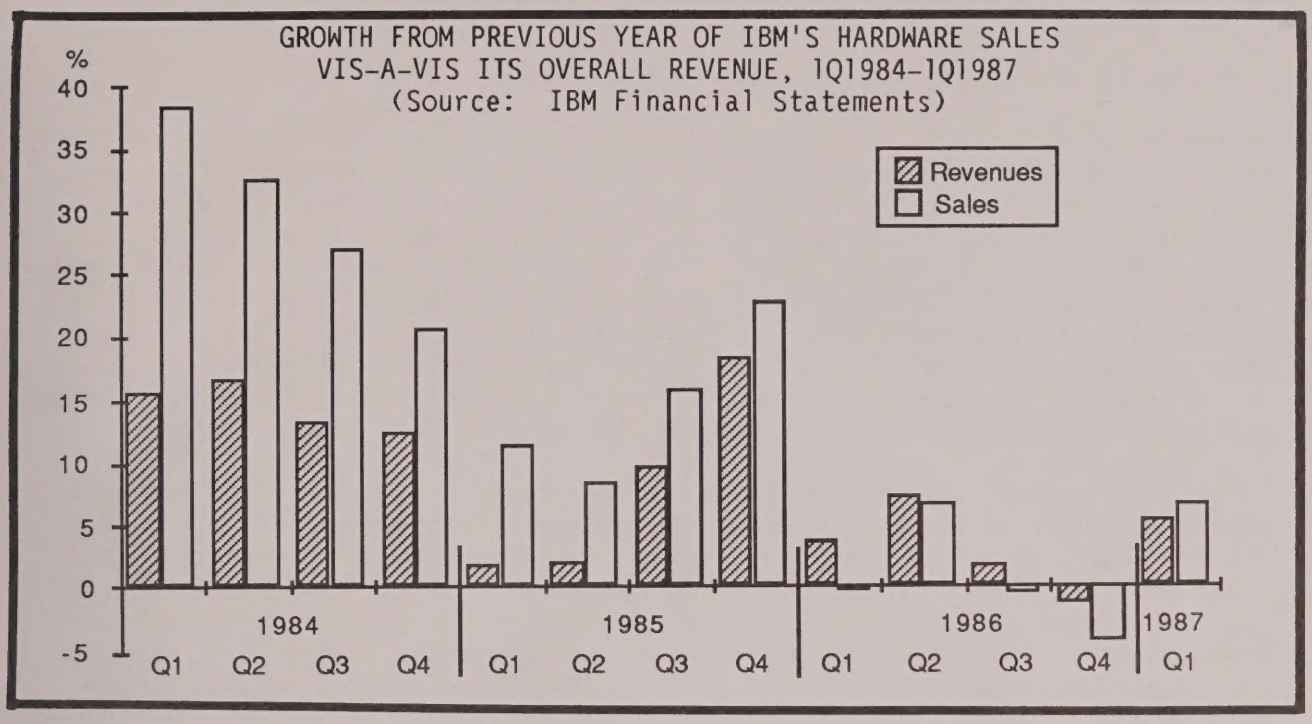

"THE SECRET OF MY SUCCESS," STARRING . . . IBM?

Hoodathunkit? IBM announces that its first quarter revenue is up just 5.5%, a paltry gain by historical standards, and that net earnings are down almost 23% from 1Q1986 -- and its stock jumps $2.625 because those results are much better than most Wall Street types had anticipated. There are few more telling indices of the tough times IBM has been having than what now counts as success.

Moreover, the forward momentum is still mostly supplied by converting foreign sales into weaker U.S. dollars. By IBM's own reckoning, 6.4% of its quarterly revenue ($680 million) and 12.1% of its net income ($95 million) could be ascribed to the lower value of the dollar. Without these sums, IBM's quarterly revenue would have been down 1.2%, not up 5.5%, and the decline in earnings would have been nearly a third (32.2%).

And then there's Digital nipping at the heels of the folks in blue suits. Because DEC's quarterly revenue was up 25% and its earnings soared over 80%, it gained considerable ground in the race between the industry's two leaders. For the quarter Digital's profits just missed reaching 40% of IBM's, while its sales total (i.e., essentially new hardware) came to 25% of IBM's.

So was John Akers whistling Dixie when he used the quarterly financials as the springboard for an optimistic appraisal of IBM's prospects? Not really, since, as Akers pointed out, 1Q results were achieved without the range of potentially lucrative large-scale, medium-scale, and PC products that will appear later in the year (3090-300s and 600s, 9370s, PS/2 Model 80s, etc.).

Moreover, for the first time since the fourth quarter of 1985, hardware sales grew faster, however marginally, than overall revenue: 6.5% vs. 5.5%. Throughout 1986, IBM had to depend on maintenance and software growth almost entirely. Taken in tandem with the strong growth displayed by many of the hardware vendors who have reported to date, these figures could be the first robins of spring after two years of wintry growth. Stay tuned.

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• THROWING AWAY THE DEEDS ON APOLLO'S DOMAIN. First Apollo switched from its proprietary Aegis operating system to a Unix implementation intertwined with the critical aspects of Aegis; now it has freed the Domain environment from its proprietary token ring network implementation. It has announced a controller to support Series 3000 workstations on Ethernet, which Apollo hopes can keep it under consideration at sites that are standardizing on Ethernet. For large networks and/or intensive graphics, though, it will suggest that Ethernet is noisier and slower than Apollo's own network. The real significance is that, by freeing Domain now, Apollo can take advantage of truly high-performance networking alternatives waiting in the wings for next year.

• PRIME PUISSANCE. Prime claims to have regained supermini price/performance leadership by maintaining its usual competitive pricing while carrying the MIPS war into virgin territory for general-purpose processing on medium-scale systems. The uniprocessor 6350, Prime-rated at 11.8 MIPS, is available now for $619.4K in a typical configuration. The dual processor 6550, Prime-timed at up to 23.6 MIPS, is scheduled to follow at the end of the year in configurations ranging from $804K to $920.7K. Prime emphasizes that the 6550 will be a true dual, with separate dedicated buses; one marketing argument will be that the commercial performance of a VAX 8800 is impeded by the master/slave relationship between the two processors, which keeps all I/O in one CPU. Prime technicians figure they have a window of about a year or so before others can match these performance levels in general-purpose superminidom. Now Prime has to concentrate on beefing up its low-end offerings to lure new customers, few of whom start buying at the top of a vendor's product line.

• WANG'S "AND NOW FOR OUR NEXT TRICK. . . ." Is there a WIIS in your future? Wang thinks so -- in fact, Fred Wang exults, "We have lit the fuse to the next explosive era of expansion for the information processing industry." He compares the advent of the Wang Integrated Image Systems to three earlier "technology breakthroughs": IBM's S/360, word processing (ahem), and the PC. The goal is to integrate computers with the 95% of business information that Wang estimates is still paper-based. WIIS mixes image capture, storage, and retrieval technologies (high-volume scanners, microfilm, optical disks in jukeboxes, etc.) with the PACE RDBMS on all VS systems. An entry-level version is scheduled for volume shipment in the fourth quarter, with higher-end shipments ramped up by 1Q1988. Prices will range from $100K to $750K and up.

• FIRST HONEYWELL BULL SYSTEM. In a joint announcement in Paris and Massachusetts signaling the kind of changes to be expected of the new Bull/Honeywell Bull team, the DPS 7000 (manufactured by Bull in France with some VLSI technology from Honeywell) was unveiled by both companies as a follow-on to the six-year-old DPS 7. Although the DPS 7 had fallen between the two stools of HIS's dualistic mini/mainframe strategy, Honeywell Bull vows to market the 7000 aggressively to its installed base and to specific vertical markets where the new supermini would be the high-end system in a single-vendor environment.

• UNISYS MATCHES BLUE MIDLIFE KICKER. Unisys has introduced eight replacement models, denominated by the old letter plus an X, for its A15 large-scale family that reputedly improve performance some 20% through a revision in the operating system. Maximum memory has also been increased on the lower-level A15s (a doubling, e.g. from 48MB to 96MB on an FX) and on all A12s.

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THE GRAY SHEET
Computer Industry
REPORT

D.C.BELLOMY, EDITOR March 31, 1987 • VOL.22, NO.23 P.J.MCGOVERN, PUBLISHER

BUNCH REDIVIVUS: HONEYWELL DELIVERS A BABY BULL

Flickering across the Gray Sheet's synapses during the press conference announcing the formal creation of Honeywell Bull on March 27 was the chorus to "The Yarn of the 'Nancy Bell,'" W.S. Gilbert's jaunty ballad of seafaring cannibalism: "Oh, I am a cook and a captain bold, / And the mate of the Nancy brig, / And a bo'sun tight, and a midshipmite, / And the crew of the captain's gig!" Never before the transformation of the former Honeywell Information Systems has a major computer company been owned by its principal marketing partner, its principal customer, and its principal supplier of high-end technology.

In the explanation offered in Honeywell's 1986 annual report, it is noted that the minimal growth condition that started in 1985 "brought consolidation in the computer industry, as it had in the late 1960s and again in the mid-1970s." In both of the earlier cases, Honeywell had been a major beneficiary.

In 1970, it acquired GE's computer line in a merger that Honeywell planners called "Nuco," a name that was revived for the new company until March 27. At the time the Gray Sheet called the consolidation "the most significant development in the computer industry yet" (Vol. 5, No. 15, May 29, 1970). Some advantages proved ephemeral, but Honeywell Information Systems did gain from GE a large-scale architecture and G[E]COS operating system from which are descended the current mainframe products of Bull, NEC, and Honeywell Bull.

In 1975, Honeywell began to service the user base deserted by Xerox. Also, lengthy negotiations created CII-Honeywell Bull, whereby Honeywell and Bull (already partners in the first Honeywell Bull, the inheritor of Bull's distributorship for GE computers in Europe sans the U.K. and Italy) hooked up with CII in a complex relationship in which French investors (including the government) held a majority position, but Honeywell set the directions.

By 1975, however, it was clear that consolidation and division of labor would not markedly improve HIS's competitive position vis-a-vis IBM. That summer Edson Spencer, then as now Honeywell's CEO, had to send a letter to stockholders "to assure you personally that there are no plans, strategies, or negotiations under way that would lead in any way to our leaving the computer business." For the next decade, Honeywell would have to fight such rumors lest they become a self-fulfulling prophecy -- which eventually they did.

In retrospect, the management of Honeywell Bull date Honeywell's decision to divest its information systems division back to 1983, when the company made the "difficult call machowise" to turn to NEC for high-end technology, beginning with the DPS 90 (NEC's ACOS 1000). NEC had licensed technology from Honeywell since 1962, but by the 1980s the Japanese pupil had surpassed its teacher. In 1985, Honeywell Japan was sold to NEC to avoid product overlap.

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A high-level Honeywell team, codenamed "Restless Spirit," began to explore alternatives for HIS. Its deliberations were given a sudden push last year during the Burroughs bid for Sperry, when Honeywell offered to help Sperry restructure by buying part or all of its defense business. Sperry, however, reportedly insisted that if Honeywell was going to play white knight, it should kill the dragon and buy all or part of the computer line in lieu of Burroughs.

Honisys was not to be, since Spencer supposedly felt that the GE/Honeywell merger had been difficult enough without another try at meshing disparate product lines. However, the Burroughs/Sperry merger was apparently the final straw that convinced Honeywell management that consolidation was the only way out. Rather than risk alienating either Honeywell's user base or its investors, they began to explore divesting HIS as a private company owned by the three international vendors most interested in its future: Honeywell, Bull, and NEC.

The final deal follows the plans outlined in an earlier issue of the Gray Sheet (Vol. 22, No. 15, December 5, 1986). Unless the deal is restructured, NEC is the permanent minority member, with a 15% interest. Honeywell indicates that it will definitely exercise its option to sell enough of its share at the end of 1988, at a price to be determined by the new company's strength at the time, to bring its share from the current 42.5% to just under 20%.

The two-phased withdrawal seems designed to allow Honeywell to leave the computer business in a gradual, hopefully dignified fashion that will not stimulate user or investor qualms. Honeywell's annual report indicates that HIS as formerly constituted would have increased 4.7% in revenue in 1986, to $1.7 billion, but after one-time charges it would have suffered a loss for the year of $3.3 million, following a profit of $55.8 million in 1985.

Jacques Stern, CEO of Bull, told the Gray Sheet at the announcement that the French company will definitely exercise its option to buy the Honeywell shares and bring its stake from 42.5% to 65.1%. This ratio is already reflected in the board of directors for Honeywell Bull: five from Bull, including Stern as chairman of the new company as well as Bull, plus Bull's chief operating officer (Francis Lorentz), its chief financial officer, general counsel, and one other representative; two from Honeywell, including Bill Wray, executive VP for corporate marketing; one from NEC (Hisao Kanai, a senior VP and director); and the president and CEO of the new Honeywell Bull, Jerry Meyer.

It is Bull, then, that has the most to gain from the new company, and the most to lose. Without HIS/Honeywell Bull, it would lose much of its product line, but the decision to accept control of its former chief stockholder's destiny is even more a testimonial to Bull's ambitions than to its fears.

In particular, it testifies to the drive of the Stern-Lorentz management team. Even the ongoing apotheosis of Digital's Ken Olsen pales beside the descriptions of their success in turning Bull around after the French government took over Honeywell's position as chief stockholder. As Stern describes the transformation since he was recruited from his SESA systems engineering/data comm company, "In 1982, Bull was in danger of disappearing. . . . Today, in Europe, Bull is the number two supplier of information systems."

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"BUNCH" PROPORTION OF THE VALUE OF WORLDWIDE MULTIUSER SYSTEM SHIPMENTS BY U.S. VENDORS, 1982-1986
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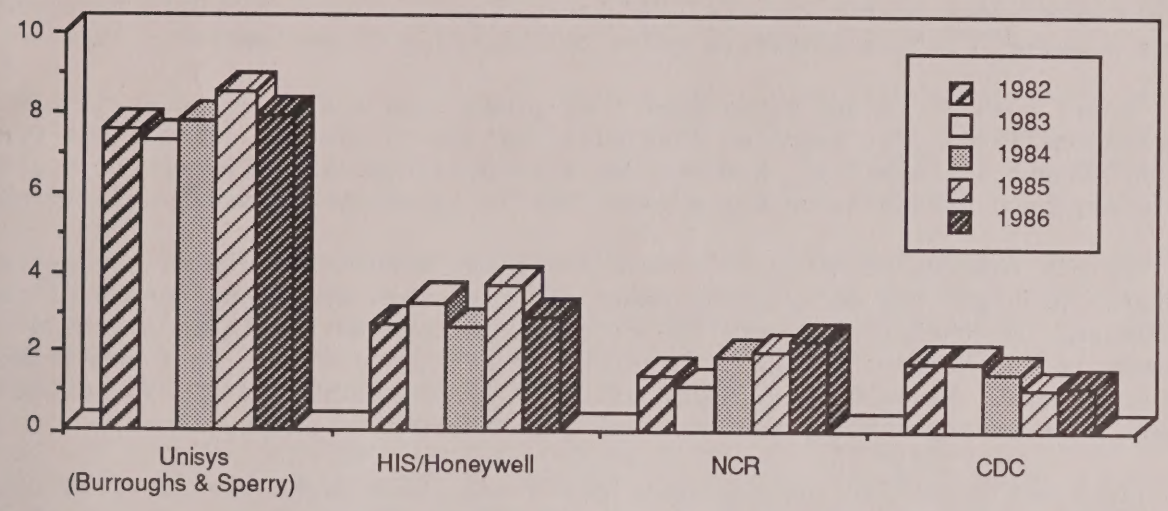

The implication is that, what Stern did for Bull, he can repeat with Honeywell Bull. The point man will be Jerry Meyer, who rejoined Honeywell in August 1986 after an unhappy tour fighting hostile takeover moves as president/COO of Varian Associates. Meyer signed on with the understanding that he would be the likely CEO of the divested company, then a closely guarded secret.

Stern and Meyer will share one advantage that Stern had at Bull: freedom from demands for short-term results, when the critical requirement is for long-term development. Just as the French government was willing to give Stern enough time to turn Bull around, the three owners of Honeywell Bull have every reason to give the management team latitude to make their investment pay off. The new company is probably sufficiently distant from the private investors in Honeywell and Bull to keep the pressure off, and NEC thinks long-term anyhow.

Nevertheless, there remain two key problems that Stern has not had to confront before, and that may be beyond the capabilities of the management team that Meyer is reshaping from the old HIS crew:

- Honeywell Bull must succeed in the American market, where HIS was moribund and Bull has never participated except in peripherals.

- Although the three companies have cooperated for decades, they have separate interests that, in the institutionalized environment of a board of directors, could create corporate stasis.

The first priority is the U.S. market, because (1) that's where the problems are, and (2) there's nowhere else to turn. As noted last issue, the 1:0.9 U.S./international split for Honeywell Bull may seem typical for the industry in 1986, but there has been little alteration in the marketing allotments dating back to GE/Bull arrangements. Most of Europe, notably France and Germany, stays with Bull, while Japan is NEC's turf. In other words, Honeywell Bull's U.S. take is barely bigger than the combo of Britain, Italy, and Australia, plus spare change. We are not talking about a major force in the U.S. market.

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How can it become one again? There are no easy answers, any more than there are for anyone trying to grow in the small-growth U.S. environment. There will be some rationalization of the payroll, some of it based on individual productivity, but there is not that much fat at Honeywell Bull, particularly after last year's layoffs. In fact, there are some 2,500 fewer employees than Honeywell had in computers prior to absorbing GE employees in 1970.

Also, both Stern and Meyer feel that production and the product line must be rationalized. For example, five different factories now produce the DPS 6, with 40% excess capacity. However, as with personnel issues, effective pruning here may be a precondition for growth, but it is not the same thing as growth.

In his remarks on March 27, Stern cited as "Honeywell Information Systems' largest problem" the uncertainty among its customers about the future of the division. He therefore counts the creation of Honeywell Bull as itself a remedy to the company's biggest headache by affirming a long-term commitment to computers. Nevertheless, while effective exploitation of the installed base is necessary for any vendor, real growth requires new business.

In their quest for new business, Meyer and Stern emphasize in particular that, due to Bull and Honeywell Bull's experience and expertise in departmental computers and standards-based networking, there is real potential in systems integration. The buzzword will be what Meyer calls "strategic data integration." He avers that Honeywell Bull "will approach the market from a user's point of view -- not only as a traditional hardware vendor."

The strategy has a lot to recommend it, but not novelty. In fact, it sounds like what HIS managers have been saying for a couple of years, but now it must be implemented without the services of some of the employees with the most experience in systems integration -- the Federal Systems Division, which due to government regulations about vendors with significant foreign ownership has been retained by Honeywell rather than transferred to Honeywell Bull. Moreover, other hardware vendors, not least in their number IBM, have recently hopped aboard the SI bandwagon, and all must combat users' perception that a hardware company is not the most unbiased source of systems integration.

It is obviously too early to evaluate how successful Honeywell Bull can be in turning around U.S. sales, since Meyer is not even due to present his detailed business plan to the board until June. What it is not too early to say is that he has his work cut out for him, and so does the board.

Which brings up the second issue. Although Bull's five members constitute a clear majority of the board, the minority members have veto power on some dozen issues, including product lines and strategic directions. This is potentially troublesome because, as intimated in the opening paragraph, the three owners represented on the board constitute three different interests. Then there is a fourth interest, symbolized by Meyer: Honeywell Bull.

That the differences are more than just hypothetical is suggested by tales told on good authority to the Gray Sheet about the difficulties the partners had in coming up with a name for the new company. Honeywell, it's said, would rather its name not appear at all, since it was trying to disassociate itself from computers. Both NEC and Bull, though, sought to take advantage of a name well known in the U.S., and Bull wanted its name on the company stationary, even after it was warned about the possible scatological jokes in English.

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Another potential conflict of interest, this time between Honeywell and Honeywell Bull, was also resolved, at least for now, during the negotiations over the past months. HIS's largest customer was the U.S. government, followed by GE, and then Honeywell for internal use. However, because Honeywell Bull is debarred from the federal market, all future federal sales will be handled by Honeywell, which thus becomes Honeywell Bull's largest customer.

That is all well and good, except that Honeywell saw the opportunity to expand its federal role by acting more like EDS, a systems integrator unfettered by commitments to a particular computer line. Meanwhile it was obviously in Honeywell Bull's interest to lock Honeywell into its computer line.

The result was a compromise whose exact details have not been announced. Honeywell agreed to purchase a specific percentage of systems from Honeywell Bull for the federal market, but can look elsewhere beyond that figure. Also, while all Federal Systems revenue is accrued by Honeywell, the operating profit will be split between Honeywell and Honeywell Bull.

By the way, HIS systems for the federal market and Honeywell internal use are among the chief reasons for the difference between the $1.7 billion cited as HIS revenue in 1986 by Honeywell, and the $1.9 billion claimed by Honeywell Bull, which computes 1986 revenue as if under the conditions it will now be selling products. Other financial arrangements between Honeywell and Honeywell Bull also apparently help account for the $200 million difference.

The federal market issue suggests how there are implicit contradictions between being an owner and a customer of a computer company; there are also potential conflicts between being an owner and a supplier. An issue that has not been resolved as yet involves the interests of Honeywell Bull and NEC.

Even before the U.S. government raised the specter of possible 100% tariffs on the DPS 90s imported from NEC (see the story on page 7), it was obvious that trade conditions would be a potential problem. Also, the strong yen has been creating difficulties for a product with inherently low unit volume.

Honeywell Bull management expect that there will be intense discussions about the DPS 90 over the coming months. Their own first choice would be to tell NEC that it's a Japanese problem, but that becomes a little delicate when NEC can just say "nyet." Alternatives would be to move production of the DPS 90 for the U.S. market to Honeywell Bull at Phoenix, or, if NEC doesn't bite, give the 90 U.S. citizenship by selling the Phoenix plant to NEC.

And if NEC says no to all three of Honeywell Bull's preferred options? The ensuing stalemate might lead to memories of another group of allies, way back in 1945, who tried to keep the peace by giving one another veto power.

The Gray Sheet once more reiterates that some kind of partnership between Honeywell, Bull, and NEC was probably the best way to protect the interest of the HIS installed base, and that the protected status of Honeywell Bull gives it necessary time to work out the problems. But the problems must not be ignored. They may not have surfaced in the understandably roseate analyses offered on March 27 in New York, but Honeywell Bull's head matadors are obviously not oblivious to them. As Francis Lorentz put the case, "We must acquire a method of international management and especially understand the specifics of the American market. If not, we will be swept away."

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THE BUNCH ONCE MORE?

One irony of the decision of the three owners to name the new HIS entity Honeywell Bull is that, after all the contortions and distortions of the past year, the Bunch acronym is once more intact. The vowel movement that seemed in the offing when Burroughs swallowed Sperry (Univac) was restored with the advent of Unisys, while the addition of Bull to Honeywell allows, if you've a mind to rearrange the order of letters, a way to replace the "B" for Burroughs.

But do references to the Bunch make sense any longer? If the idea is to depict vendors with mainframe alternatives to IBM or IBM compatibility, NCR hasn't belonged for quite a while, but Digital is again demanding admittance. This would maybe dictate turning BUNCH into CHUD, for Control Data, Honeywell Bull, Unisys, and Digital, but euphony still counts for something.

The other connotation of Bunch has been major players who have been having a difficult time competing with IBM. After all, "Bunch" was the inheritor of the "Seven Dwarves" tag after two bowed out of the computer business. By that token Digital would not belong, and maybe not NCR either. Chuck Exley recently told the Boston Security Analysts Society that, after his company's revenue grew 13% and earnings increased 9% amid the continuing Great Softness of 1986, he was "very optimistic" that NCR would set new records for both in 1987.

So who should we put in their place? AT&T maybe? That would give us HUAC, an acronym with an unpleasant odor dating back to the days of McCarthyism. Or maybe HUIC, since even IBM can't compete with its own past record. . . .

For the nonce, though, the Gray Sheet will stick with "Bunch," solicit any suggestions for better groupings and acronyms, and keep track of the efforts of the member companies to improve their market position. Two members of the Bunch held New York press conferences the same week as the Honeywell Bull announcement in order to update people about new products and strategies.

The principal new Unisys products were for former Burroughs lines: new high ends for the V series of medium-scale systems, plus a 386-based addition to the B 25 line. Much was therefore made of the fact that the chief presenter was Unisys's vice chairman, the former president and heir apparent at Sperry. As he put it, "A year ago, who would have thought Joe Kroger would be officiating at a press conference to announce a group of new Burroughs products?"

Kroger emphasized that, in important respects, the Unisys merger is now only a couple of months old. In particular, the realignment of U.S. marketing was completed only this January, which he feels partly explains weakish 4Q 1986 results and could affect order rates for the first quarter. Also, the first joint products are only now appearing. The Sperry PC-IT can now coexist in a BTOS cluster with ClusterShare, the Burroughs Unix offerings have been integrated with the Sperry line to share applications and peripherals, and a crossporting of LINC II and Mapper was all but officially announced.

It was a week of self-conscious role reversals. Instead of HIS directing Bull, Bull took charge of Honeywell computers; Kroger discussed the benefits of the Burroughs/Sperry merger; and Control Data introduced a new system with wheels that can roll out of the computer room into departmental processing. The message was that CDC is serious in its intent to offer a full range of capabilities for scientific/engineering customers.

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MASSIVE RETALIATION IN THE CHIP WAR

On March 27 the Reagan administration published a list of 19 categories of electronics imports from Japan on which 100% duties could be imposed in retaliation for what it considers breaches of last summer's truce in the chip war. It values the goods at some $900 million (an underestimation by a sizable amount if the categories are indeed as inclusive as they sound); by April 17, when the tariffs would take effect, the list would be cut in order to reach a $300 million value and to better target culprit vendors in Japan.

Among the 19 categories, of special interest to the computer industry would be data processing machines and disk drives (which is why the $900 million figure seems out of line). Other categories on the list include phonograph/tape combos, televisions, air conditioners, and communications satellites.

One reason for the three-week gap in time between the publication of the original list and the final decision is to allow interested parties in the U.S. to comment. By levying the impost on finished products rather than on chips, the government has lessened the chance that the U.S. electronics industry will be seriously divided on the issue; however, some U.S. computer vendors (e.g., the PCMs) depend heavily on Japanese products.

It's a case of blood and irony for National Semi, which would be ecstatic if duties on processors and disk drives lead the Japanese to crack down on its Japanese rivals, but in the meantime risks an erosion of the U.S. market for its NAS subsidiary. An NAS spokesperson told the Gray Sheet on March 30 that it is "too early to tell" for sure, but the company is investigating a worst-case scenario in which 100% duties in the U.S. would hit all the mainframes and DASD (except for solid state devices) that it gets from Hitachi. Affected, we are told, would be 30-40% of NAS's worldwide business.

Other OEM/distribution relationships would also be involved, although usually less drastically. Amdahl feels that even if the final list includes all processors and disk drives, it would experience only a fiscal hiccup. The subassemblies it imports from Fujitsu for its IBM-compatible mainframes are not included in the list, while the Fujitsu plant in Portland is scheduled to go into operation in June. With inventories, that should leave Amdahl exposed to 100% tariffs on disk drives only at most for a few weeks in May.

With luck, much of the worrying could prove short-lived, even unnecessary. Obviously the Japanese government will jawbone with greater zeal than ever before, and now the major Japanese semiconductor vendors have reason to pay close attention -- after all, they're the same companies (Fujitsu, NEC, Hitachi, et al.) that stand to be penalized the most by the tariffs.

Still, three weeks are an awfully short time for the Japanese to come up with a program that the administration could sell to Congress and most U.S. semiconductor and computer vendors. The task is especially difficult because it involves two separate issues: the alleged dumping of chips on the "gray market" (i.e., via intermediate countries rather than directly), and the continuing difficulties U.S. computer firms face competing in Japan.

At this point, then, it seems that tariffs will be in effect for a while at least, and that, in a world of economic interdependence, some U.S. companies could be saying "ouch" when their Japanese allies get pinched.

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• SPECTRUM SCHEDULING. With word that the 3000 Series 930 is now in beta testing, HP affirms that it is on schedule for midyear delivery, and that the 950 should follow in the second half of 1987. However, HP has not completely discounted the possibility of further delays for the first commercial Precision Architecture systems. It notes that, although much progress has been made in correcting the performance degradation in the interface between the I/O, the database, and HP's proprietary MPE XL operating system, "much work remains to be done" at the beta sites in testing 930 performance with actual applications.

• EVER SO SLIGHTLY EARLY AVAILABILITY. This one isn't exactly a bolt out of the blue -- IBM has announced that the 9370 will be shipping at the early end of the previously announced schedule. Models 20 and 60 "with a selected set of features" will be generally available in July, rather than just some time in the third quarter, with the 40 and 90 following in October rather than some nebulous point in the fourth quarter. "Early Support Program" customers can get 9370s in March rather than in the second quarter.

• SGI/PRIME/MIPS INTO THE FOURTH DIMENSION. The two-year-old Prime/MIPS workstation project, updated last year to a Prime/Silicon Graphics/MIPS affair, has finally borne fruit with SGI's Iris 4D/60 running on a 5-MIPS RISC chip from MIPS. Sun and Apollo use 68020s, for which 5-6 MIPS are currently the ceiling rather than the ground floor. The 4D means 3D graphics plus real-time. Prime announced that it would market the Iris 4D/60 as the PXCL 5500.

• NEW DIGITAL ENGINEERING/MANUFACTURING DESIGNS. First Digital announced the Industrial VAX 630, a ruggedized controller for the factory floor based on the MicroVAX II. It's pricier than some of the competition, but it boasts 32-bit performance rather than the 16-bit CPUs in IBM's 7552, HP's 1000, or Digital's own PDP family. The most significant aspect of the announcement may in fact be Digital's decision to begin obsoleting the PDP in one of its historic niches, since despite its continuing contribution to Digital revenues the PDP does not fit neatly with DEC's single-architecture marketing strategy.

The other new Digital announcement doesn't undercut one of its own product lines, but goes after some of its key turnkey customers. By selling Autodesk's AutoCAD VMS drafting software for the VAXStation 2000 and GPX workstations directly to end users, Digital will be competing against OEMs like Applicon and Calma. No surprise, then, that Applicon is starting to unbundle software.

• GOULD MINISUPERS. The NPL minisuper family, introduced by the company's chairman/CEO as "by far Gould's most significant computer line developed to date," commences with the NPL1 series. The entry-level model, available in 3Q87, starts at $395,000 for 12 MIPS/40 MFLOPS; the high end, scheduled for 1Q88 delivery, gives up to 96 MIPS/320 MFLOPS for $2.9 million.

• THE MILLIONTH MAC. On March 17 Apple presented the 1,000,000th Macintosh to Jef Raskin, who headed the development team that started work on it in 1979. Raskin now presides over his own startup. The presentation took place at the pizza joint where the team used to meet to debate bits in between bites.

• DEPARTMENT OF EXPLICATION AND AMPLIFICATION. After misreading a confusing IBM-supplied chart, the Gray Sheet misspoke in Vol. 22, No. 19-20, February 27, 1987: The 300E is in fact <u>not</u> upgradable to a 400E, but only to a 600E.

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Computer Industry
REPORT

D.C.BELLOMY, EDITOR MARCH 18, 1987 • VOL. 22, NO. 22 P.J.MCGOVERN, PUBLISHER

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THE GREAT SOFTNESS IS THE SPECTER THAT IS HAUNTING EUROPE

According to one of the songs in Franz Schubert's great "Die Winterreise" (Winter Journey) cycle, "Fliegt der Schnee mir in's Gesicht, / Schüttl' ich ihn herunter./ Wenn mein Herz im Busen spricht, / Sing' ich hell und munter" (When the snow flies in my face, I brush it away; when my heart cries out in my bosom, I sing bright and cheery). Many of the participants at this year's Hannover Fair were equally resolved to keep a brave front in the cold and snow that immured the north German city this March, but they also had to breast the chilly winds of the continuing Great Softness across the Atlantic.

As noted in these pages two issues ago (February 27, 1987), many U.S.-based vendors, notably IBM, were dependent on the international market for what revenue growth they achieved last year; yet often much, sometimes all, of this growth was a function of translating foreign currencies into comparatively weak dollars rather than of increasing demand abroad for American computer hardware. Did this augur an emigration of the Great Softness from U.S. shores?

The Gray Sheet traveled to Hannover to learn how European vendors were dealing with the question. It was, as one company representative said, "the, what is the English, 64 dollar question." It is also the 64 pound, mark, franc, and lira question, on which there was little consensus as to the answer.

As to the current state of European industry, most vendors tended to peg 1986 growth in their dominant market at around 5% less than their own corporate growth rate. Thus president/COO Francis Lorentz of Groupe Bull, whose revenue increased 10.5% over 1985, thought that the French market as a whole grew only 5% in 1986, compared to 15-16% in 1985. Lorentz's remark was the most disquieting estimation of current trends heard at the fair.

Representatives from Siemens and Nixdorf, both of which grew over 15%, opined that the German market expanded around 10% or more in 1986, although a spokesman for Olivetti, whose German subsidiary did not see growth comparable to the native vendors, believed that overall German growth was more like 5-8%.

As to the immediate future, all were aware of the historical pattern that the European industry tends to trail the U.S. by a year or two. Some vendors, Bull included, were clearly concerned (although Bull has another reason to fear the Great Softness, since it is assuming control of a major American vendor).

The most sanguine prognostications came from the ranks of German-based vendors. Company representatives emphasized that they were speaking for themselves, not advancing a corporate position, in suggesting that, while European growth would eventually top out, it should stay within a range of 8-12% for the rest of the 1980s. Their reasoning ran as follows:

- European users are more conservative than their American counterparts and have been more reluctant to invest in new hardware simply because it runs faster and better. As a result, incremental purchases in tandem with the natural increase in users' requirements should obviate the MIPS surfeit in the U.S.

- Although large-scale system growth may stutter over the next couple of years, this development would be less traumatic in Europe, where small-scale systems and less powerful mainframes in IDC's medium-scale category are more common. Again the comparative conservatism of European users could be a godsend to industry vendors.

- Europe is really a congeries of separate national markets, some of which (Spain is often cited) still display high-growth potential.

- Vendors in both Europe and the U.S. have learned from the recent past in America and are much better equipped to address users' concerns for standards, communications, and compatibility.

At the very least, European vendors should be able to avoid the most dire consequences of the downturn in the U.S., which occurred because computer manufacturers had committed large capital investments to accomodate high levels of growth that turned out not to be there. The Gray Sheet sensed that even the most optimistic vendors in Europe are hedging their bets.

Vendor Strategies

European vendors have a reputation for being different from their American counterparts, largely because they have to -- the best way to compete in Europe against a U.S. vendor (particularly the blue-hued one) has been to tailor products and marketing to local conditions. One depressing effect of the current quiet anxiety, though, has been to make everyone sound alike. The Gray Sheet had hoped that Hannover would mean a week without hearing about the "solutions" solution to the hardware impasse. Alas, "solutions" was also the buzzword auf deutsch, and probably every other European tongue as well.

One strategy that may be losing a little of its appeal in Europe is betting on Unix. Although the two-year-old X-Open Group to which all the major European multiuser vendors belong is preparing for a more permanent organization and role, its individual members appeared to the Gray Sheet to be backing off a little from Unix, or at least carefully circumscribing their commitment. Only ICL declined to temper its public enthusiasm for Unix.

Still, there remain differences. For example:

Siemens. The market leader among native vendors in German-speaking Europe still depends heavily on small-to-medium mainframes for general purpose computing. A spokesperson stated that there are currently 3,500 systems running the Siemens proprietary operating system, BS2000, although the top-of-the-line system manufactured by Siemens today runs only up to 12 MIPS.

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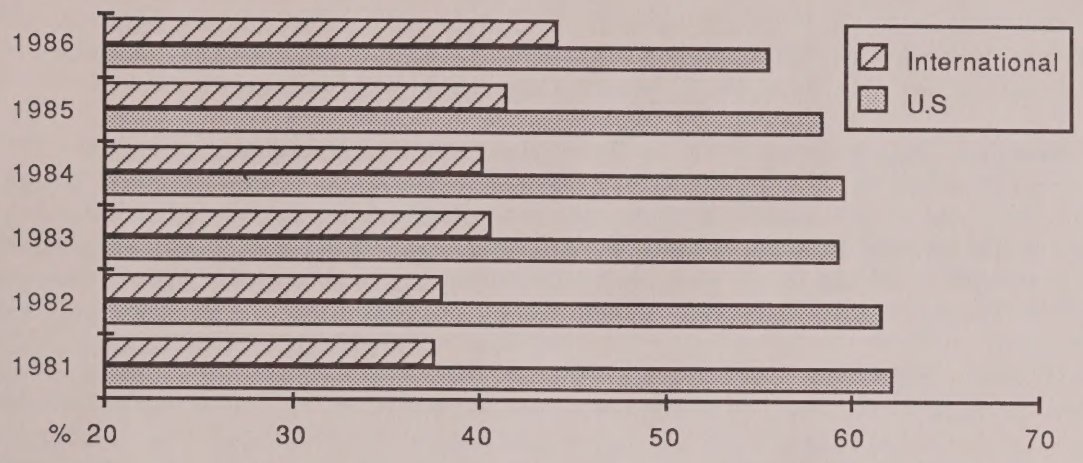
U.S. VS. INTERNATIONAL PERCENTAGES OF THE VALUE OF MULTIUSER SYSTEM SHIPMENTS FROM U.S.-BASED VENDORS, 1981-1986
(Copyright 1987 -- International Data Corporation)



Therein lies part of the reason Siemens got into the IBM PCM business -- and part of the reason it got out. Siemens now says it had two goals in going PCM in 1978: to offer its installed base of major corporations a choice of products at the high end, and to learn more about commercially successful mainframe architecture from the masters in Armonk. An OEM arrangement with Fujitsu for IBM-compatible large-scale systems allowed them to do both.

Siemens doesn't deny that IBM pressure on their user base was an irksome problem a year ago (see the Gray Sheet, Vol. 21, No. 22-23, March 28, 1986, and Vol. 22, No. 16, December 16, 1986). However, it emphasizes that the days of PCMdom were numbered, since Siemens had learned what it wanted to, and the IBM option distracted from today's BS2000 as a true mainframe operating system.

Siemens now concedes that it was not the most aggressive of PCM vendors. By January 1 there were only 235 IBM-compatible Siemens 7800 systems installed, and the company couldn't sell storage devices into the IBM base the way that Amdahl, NAS, and BASF did because it didn't get plug-compatible disks from Japan, Inc., but simply OEMed 3380s from IBM. Not surprisingly, the contract stipulated that Siemens couldn't sell storage into IBM sites.

Consequently, on January 1 the 235 IBM-compatible systems were transferred to Comparex, a new joint-venture of Siemens and BASF, while under a new contract Fujitsu will be supplying large-scale systems, now named the 7500 series, that will run only on BS2000.

Beneath the BS2000 systems are situated 16,000 Unix systems, a number Siemens calls the largest in Europe. It sees a potential market of 600,000 small businesses, large customers with branches, and end-user departments that it can attract with integrated Unix packages. However, it doesn't hide its interest in keeping Unix customers separate from the proprietary BS2000 base.

Nevertheless, Siemens is heavily depending for 1987 growth on Unix and dedicated systems (especially CAD/CAM), as well as on "soft" revenue from system and application software and from service. "Mainframes" contributed to 1986 growth, but the company is not banking on a repeat performance this year.

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Comparex. The money may come from Siemens and BASF in equal amounts, but the personnel and philosophy lean heavily towards BASF, which supplies three out of the four members of the governing board (the president and vice-presidents for sales and technology, with financial administration going to Siemens) and two-thirds of the sales force. Under the circumstances, it follows that Comparex will be selling Hitachi systems to all new accounts, although it will continue to service the old Siemens base with Fujitsu parts.

Another legacy from BASF is an emphasis on selling peripherals, which used to provide most of the profits of its PCM business. The Comparex executive that the Gray Sheet spoke with noted that the sales force inherited from Siemens is having to learn how to sell storage and other peripherals, but it also appears that ex-BASF personnel must learn how to sell mainframes, since a very small percentage of the former BASF installed base is large-scale systems.

If these problems can be ironed out, it is possible that Comparex could become a major PCM force in Europe. In particular it could mute some of the strong growth in international sales displayed by NAS last year, since both companies will deal in IBM-compatible boxes and peripherals built by Hitachi.

Nixdorf aspires to Siemens' market presence (e.g., over the past few years it has added PBXs, historically a Siemens strength, to its portfolio), but U.S. readers can probably best understand Nixdorf's recent success by thinking of it as the European industry's equivalent of NCR.

Like NCR, Nixdorf sells midrange systems to particular markets. It is one of the few vendors in Europe or elsewhere that can get away with phrases like "the traditional Nixdorf emphasis on system solutions." In 1986, about a third of Nixdorf revenue came from banking (mostly front office); 10% from retail/hotel accounts, including POS terminals; 12% from large corporate accounts (a percentage it wants to expand on); dibs and dabs from telecom and the public sphere; and another third from an array of small businesses.

Small businesses as defined by Nixdorf could mean 10,000 Volkswagen dealers in an arrangement brokered by VW, but they also include a number of highly specific vertical markets that other vendors would leave to VARs. The key, Nixdorf notes, is the easily customized Comet software on its 8870 line. Comet's chameleon-like nature not only allows for niche applications, but also facilitates the translation of standard accounting and office packages into the other languages used in the rest of Europe, which currently accounts for 35-40% of Nixdorf's revenue, compared to over 50% for Germany.

Again like NCR, Nixdorf sells a popular Unix-based supermicro. However, while at first few at NCR anticipated the success of the Tower, at Nixdorf there were originally suggestions that Targon would be its principal platform by the 1990s. Now, though, NCR is happy with a two-platform strategy, while Nixdorf has covered its bets by building up its Comet offerings and developing its proprietary line with the 8870 Quattro, with up to four processors.

The Targon targets are presently the factory floor, software development, the office, and transaction processing (the Unix kernel was rewritten to create a dual-processor fault-tolerant Targon). Nixdorf would like to take advantage of the paucity of third-party Unix software by becoming Europe's chief Unix solutions source. However, it could wind up competing with its own Comet/8870 success; Nixdorf may yet have to decide between its two platforms.

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Bull, as befits an imminent force in American computing, sounds most like American vendors in proclaiming that, because it cannot and will not compete on price in an environment of commoditization, it will "sell solutions, not products." Francis Lorentz cited three strategies that it began to implement seriously in 1986: connectivity; sectoral solutions; and open systems. Bull's heavy investment in training new hires for consultancy was cited as a potential drag on short-term financial performance, but necessary in the long term.

Parenthetically, Lorentz broke the news of how "Newco" -- the Honeywell/Bull/NEC entity that will be formalized later this month -- did in 1986. Revenue was $1.895 billion, of which $1 billion came from the U.S., $715 million from the U.K. and Italy (the two major European countries that Honeywell could sell into under its arrangement with Bull), and $180 million from the rest of the world. This would mean that "Newco" (essentially HIS) did over 70% as much business in two countries with under half the combined population and a quarter of the combined GNP of the U.S. However, the U.S. figure doesn't include the government business that Honeywell retained.

DEC TAKES ANOTHER LEAF FROM IBM'S BOOK

Those who can remember the past can doom others to repeat it -- at least that's how Digital interprets George Santayana's aphorism when it comes to profiting from how IBM has made money in the past. The latest example came with the mixture of sharp price increases and decreases that Digital announced on March 4.

Most increases are on the system building blocks (AKA boxes) on all VAX 8XXX systems announced prior to March 4, with the exception of preconfigured clusters and models discontinued as of that date. The price ascent is steep:

Building Block	Old Price	New Price	Increase
8800: 48MB, fl pt, 1-yr VMS & DECnet	$672,000	$787,000	17.1%
8700: 32MB, 1-yr VMS & DECnet	$433,000	$502,000	15.9%
8650: 16MB, full VMS	$400,000	$497,000	24.2%
8600: 4MB, full VMS	$350,000	$447,500	27.7%
8550: 32MB, fl pt, 1-yr VMS & DECnet	$364,000	$419,000	15.1%
MicroVAX II: 1MB, fl pt	$12,000	$14,650	22.1%

These figures were not publicly announced on March 4. What was announced was a halving of the cost of incremental memory (e.g., 16MB for 8550s and above are $16,000 rather than $32,000, and for smaller 8XXX systems 4MB cost $6,000, not $12,900) and a $3,000 price cut for RA81 disks (at $16,000 each, this brings the cost/MB down from $42 to $35). Also, since Digital simultaneously announced a one-year warranty on all its hardware products, an RA81 would get nine more months, which the company values at about $900.

In short, Digital has it now -- namely, the ability to milk the captive installed base and undercut the competition that IBM has used so effectively in the past. But after all, why not make hay while the sun shines?

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It is possible, of course, for some users to escape unscathed. A Digital spokesperson points out that the purchaser today of an 8700 with an additional 32MB of memory and 10 RA81 disks would pay $2,000 less than before March 4. However, if the putative $900 value for additional warranty per RA81 is disregarded, the figure would actually be $7,000 more. Furthermore, many users will want to mix the building blocks with existing peripherals (e.g., in clusters), and the price cuts do not apply to Digital's new SA482 disks.

The chief target of Digital's new pricing policy, though, seems to be the third-party Digital add-in vendors like Emulex. Digital is raising prices where it has no PCM competition -- on the boxes -- and lowering them where it does. As a bonus, it can clear out inventory on RA81s before introducing a single-spindle version of the SA482, available now only in a package of four.

Digital also announced a simplified discount structure based on dollar volume for large end-user customers and resellers alike, with the exception that OEMs can get additional discounts on systems that Digital really wants them to sell (e.g., the MicroVAX 2000) and in markets where it is weak. The effect is to tighten Digital's control of its channels of distribution.

New Low-end VAX Models and Positioning

On March 4 Digital also introduced three new processors to shore up the bottom of its 8XXX line. There were probably two considerations: as matters stood, the less potent 8XXX VAX systems were suffering erosion due to the popularity of the MicroVAX II, and they might have been hurt even more after the delivery of IBM's 9370s later this year.

The VAX 8200, 8300, and 8500 were replaced by the 8250, 8350, and 8530. The entry-level 8250, which is rated as about 20% faster than an 8200, costs $65,000 for the 8MB building block, or 18% below the equivalent 8200 model. The dual-processor 8350 brings a little better than 8300 performance for a little under the old 8200 pricing (2 VAX MIPS in a $77,000 building block). The 8530 gives about 4 VAX MIPS compared to the 8500's 3 for 16% more money.

The low-end 8XXX pricing seems designed to make users think twice about using a MicroVAX II for more than just a couple of users -- especially when a customer looks at software pricing. The other Digital product on which prices were raised besides the boxes was most MicroVMS licenses. For up to two users it stays the same, $2,000, but for up to eight users it is up 50% ($4,000 to $6,000), and for up to 16 and for unlimited users it is more than doubled (respectively $6,000 to $13,000, and $8,000 to $18,000).

This means that a customer contemplating buying a VAX system for 16 users could choose between a MicroVAX II with 8MB of additional RAM and DECnet for about $31,000, and a comparably configured 8250 for $65,000. The cost-conscious still might vote MicroVAX, but Digital has now increased the chance that the functionality-and-cost-conscious will give the 8XXXs a second look.

In addition, the pricing of the new MicroVAX 2000 was made more attractive by adding 60% to the tag on a MicroVAX II box, plus a sharp software differential. MicroVMS licenses for the 2000 run $2,000 for up to 4 users, $4,000 for up to 8, and $16,000 for up to 16 -- much less than on a MicroVAX II because a 2000 doesn't have the disk or memory potential to compete with 8XXXs. A license for 8 or 16 users would connote a local area VAXcluster.

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BEYOND SNA: SAA

On March 17, a day usually notable for a color other than blue, IBM announced a potentially pivotal statement of direction for its customers. In answer to all the complaints about IBM's Fibber McGee's Closet of incompatible lines (not to mention the effect of the "Digital has it now" campaign), it unveiled the Systems Application Architecture. SAA moves from the communications environment of SNA to the applications that users buy computers to run.

There are three components in SAA, two of which are still largely on the drawing board (or the CASE program, as the case may be). A Common User Access and a Common Programming Interface will require a lot of work and time, apparently around two years for the specific items promised on St. Patrick's Day, longer for the full dimensions to reveal themselves. Together with a Common Communications Support based on current offerings, they will eventually allow common, consistent applications across IBM systems, from PCs on up.

Common User Access will insure a uniform end-user interface. We are already seeing parts of this in IBM's SolutionPacs, and will certainly see more.

Common Programming Interface will eventually allow a user or third-party software vendor to develop applications portable across currently incompatible systems. Some of the elements will be standard forms of Cobol, Fortran, and C (though apparently not RPG, historically the most important S/3X language), plus a procedures language based on REXX; a database interface based on ANSI and IBM SQL; a query interface extended from aspects of IBM's Query Management Facility (QMF); a presentation interface built up from the Graphical Data Display Manager; and a dialog interface that will provide for the definition, display, and management of text and menus based on EZ-VU.

Common Communications Support is mostly the alphabet and numbers soup that we're already familiar with: 3270 (on S/3X as well, although they also keep 5250), DCA, SNADS, DIA, LU 6.2, X.25, Token Ring, et al.

SAA work will initially concentrate on office applications. The areas for early definition in the office environment are document creation, document library, personal services and mail, and decision support.

The officialization of SAA, which has been an open secret for some weeks, means that users will have portability if not compatibility to look forward to, but it also poses some interesting questions for third-party software vendors. New applications will presumably be written to conform with SAA conventions, but vendors will have to decide whether to rewrite existing programs. For some players in specific niches, especially PC-oriented houses like Lotus and Microsoft, SAA opens new opportunities; for others, especially S/3X vendors, it may present a do-or-die crisis of epic proportions.

SAA is, of course, consistency on IBM's terms: it is designed for intravendor portability, not intervendor. However, because the specs must be public for software developers, many hardware competitors may be tempted to introduce hooks into SAA the same way they offer gateways into SNA.

Indeed, as IBM notes, the March 17 announcement "is the beginning of a long-term strategy similar to the process that has implemented IBM Systems Network Architecture (SNA)" -- and is potentially of equivalent significance.

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• LATEST FUSILLADES IN THE JAPANESE-AMERICAN CHIP WAR -- the war that refuses to end, no matter how many truces are signed. The latest casualty is Fujitsu's proposed acquisition of Fairchild Semiconductor from Schlumberger, called off after opposition stiffened in Washington. The Commerce and Defense Departments, two entities that have agreed on very little regarding high-tech trade policy, joined in expressing doubts. The position of the Defense Department followed lines laid out in a recent position paper by the Defense Science Board, which noted the Pentagon's anxiety about possible dependence on foreign sources of chips as the U.S. industry loses its competitive edge. Its call for government sponsorship of joint development work by U.S. chip manufacturers was cited by the Semiconductor Industry Association, whose directors voted on March 4 to establish Sematech, a nonprofit consortium to experiment with prototype chips (IBM allegedly vetoed the idea of mass production). The Commerce Department's position seemed a bargaining chip in the continuing negotiations to compel the Japanese government to get its major semiconductor manufacturers to stop finding ways to get around last year's trade agreement.

• CODD BLESS OLTP. Tandem took a giant step towards the desideratum of high-performance distributed relational database management systems with the announcement of SQL integrated with its existing Encompass DBMS and its Guardian operating system. NonStop SQL has been benchmarked at 200 debit/credit transactions per second on 32 VLX processors.

• MACSPANSIONS. Apple has, as expected, added the expandable Macintosh SE, with an internal slot for add-in cards, and a high-end Macintosh II with possible links to both DOS and Unix. The Mac II has a lot of bells and whistles (literally, with an Apple-designed sound chip) that position it more for the low-end workstation market than for the office environment.

• MCC ON THE WINGS OF A DOVE. Admiral Inman's successor as MCC chairman will be Grant A. Dove, an executive VP at TI who has been managing R&D, strategic planning, and corporate marketing. In keeping with MCC tradition, Dove is, despite his name, chairman of the National Security Industrial Association.

• NAS RESPONSES. Rather than inaugurate an equivalent to IBM's "E" models as Amdahl is doing, NAS just accelerated delivery of the two top-end AS/XL systems (the triadic 90 and the quadratic 100) from the third to the second quarter, upped the number of possible channels to 128, and increased processor storage up to 2GB by its first implementation of megabit chips.

• STORAGE ENLARGEMENTS AND TRANSMOGRIFICATIONS. Maxtor will acquire U.S. Design, a manufacturer of cache storage and host adapters and controllers, and Computer Memories, which folded its disk drive tent last year and had some cash to dispense, will "buy" Hemdale Film -- i.e., it is investing most of its assets in the form of a stock issue to the single remaining stockholder of Hemdale (the other was David Hemmings, who cofounded the company with "Blow Up" money in 1967). The new corporation, not surprisingly, will use the Hemdale name and management, which have "Platoon" and "Hoosiers" to their credit. The Computer Memories logo might look a little funny on the opening credits of, even if it's in part their cash that's financing, future Hemdale releases like "Body Slam" or "Great Expectations: The Untold Story," in which we learn why Miss Havisham was really keeping Estella alone in that mansion. . . .

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SLOW GROWTH IS NO LONGER NEWS; MIS BUDGETS PUT CEILING ON 1987 GROWTH

It was only twelve months ago that the industry was embroiled in the following debate: Was the slowdown of 1985 an aberration, and would the boom return anew again in 1986? Digital led the vendors who kept their thumbs punching skyward, while IBM's pointed downward, but either position made headlines.

Now, after basically two years of single digit growth, predicting further sluggishness in 1987 hardly gets a reaction. The reasons for the slowdown that seemed so controversial last year -- the saturation of markets, the drop in inflation, the slow economy, the inability to take adequate advantage of existing equipment, lack of product leadership from IBM, etc. -- are now relegated to the back pages of conventional wisdom, and generally go unmentioned.

What is new this year is the recognition that the industry is now a market share game. No one believes the old logic, widely prevalent as recently as 1983-84, that a steadily rising tide could lift all but the leakiest of boats. Because stealing market share is now the only way to grow rapidly, we are entering a period where there is likely to be a widening gap between the haves and the have nots.

The principal dynamics of this unsettling transformation are:

- User Spending. IDC's annual user spending survey shows that U.S. MIS budgets are expected to rise just 5% this year. MIS departments account for over 60% of all industry hardware spending.

- Mainframes. Despite IBM's new "E" series of mainframes, the outlook is for continued flat growth at least for the next half year. Lack of MIPS demand and continued tough competition from used equipment are still holding back the 3090 market.

- Minis. IBM's 9370 will help stabilize Big Blue's market share, but Digital, Tandem, and Stratus will continue to be the high flyers. Hardware spending on minis is expected to rise 6-10% this year.

- PCs. IDC expects 386 PCs to account for 4-5% of total PC shipments. This coupled with a strong shift to 286-based systems will help stabilize average selling prices, making 7-10% growth possible.

In this issue of the Gray Sheet, we'll take a look at the overall spending picture, as well as the key forces at work in 1987.

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U.S. WHITE COLLAR WORKERS
AND TOTAL INSTALLED BASE OF INTELLIGENT WORKSTATIONS*
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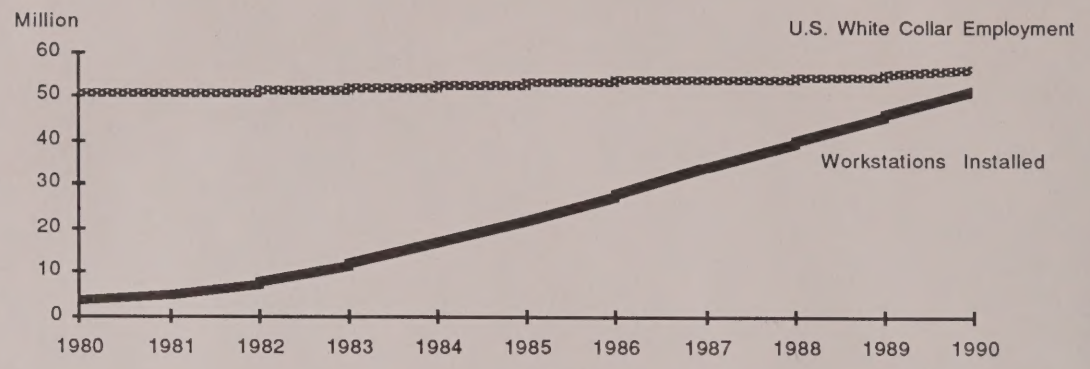

* In this chart, workstations are defined as either a PC or a CRT terminal. Home computers such as those made by Commodore are not included.

A Maturing Marketplace

It's no secret that the marketplace is maturing. The trend is towards a market where a rising percentage of sales are for replacements, upgrades, and enhancements, rather than primarily for new systems. But how far along are we in this transition? Consider the following figures:

- Of the mainframes sold last year, 56% resulted in the retirement of an installed system. In other words, the net change in installed base from 1985 to 1986 equalled 44% of total 1986 unit shipments.
- By the same logic, 22% of medium-scale shipments were replacements.
- For small-scale systems, the figure was 18%.
- For personal computers, the figure was less than 1%.

Obviously, some hardware markets are a lot more saturated than others.

Looked at another way, in the U.S. today well over 40% of all white collar workers have some sort of electronic device on their desk, and this percentage is continuing to rise rapidly. As the chart above demonstrates, by the end of the decade this ratio is likely to be very close to one-to-one. Once this happens, the industry can truly be said to have matured.

MIS Budgets Still in Check

There are many forces at work holding down the growth in MIS spending. Clearly, management is trying to control what has been one of its fastest growing cost centers. On the other hand, because information processing spending is being decentralized in many organizations, the spending growth that does occur is often not showing up as line items for the traditional DP shop.

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DIRECTION OF 1986-87 INFORMATION SYSTEMS BUDGET CHANGE BY EXPENSE CATEGORY
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Budget Category	% Expecting Upward	% Expecting Downward	% Expecting No Change
DP Hardware	38.0%	21.8%	40.2%
DP Software	43.3%	9.0%	47.7%
Communications	35.0%	11.5%	53.5%
Office Systems	26.4%	8.9%	64.7%
Factory Systems	15.5%	3.2%	81.3%
Service Bureaus	11.6%	9.9%	78.5%
Other Outside Serv.	18.1%	20.5%	61.4%
Salaries/Benefits	48.8%	14.5%	36.7%
Other Operations	21.0%	12.5%	66.5%
Total IS Budget	51.0%	16.1%	27.0%

Nonetheless, MIS departments still account for nearly two-thirds of all U.S. hardware spending. Their budgets therefore put a ceiling on overall industry spending increases. IDC recently surveyed 750 MIS departments, and learned the following:

- Spending. Overall spending will be up by just 5% this year, and spending on hardware will be slightly less than that.
- Leading sectors. The fastest growing areas will be salaries and software, with hardware and communications just behind.
- Leading industries. The fastest growing areas continue to be banking, insurance, and other financial services. Health care, utilities, government and agriculture/mining/construction are among the slowest. Manufacturing industries hover around the mean.

Capital Spending Constraints

The extent to which overall capital spending constraints put a damper on industry growth remains a difficult question. Economists have found it all but impossible to prove any sort of annual correlation between overall capital

1987 MIS USER SPENDING BY PRIMARY BUDGET CATEGORIES
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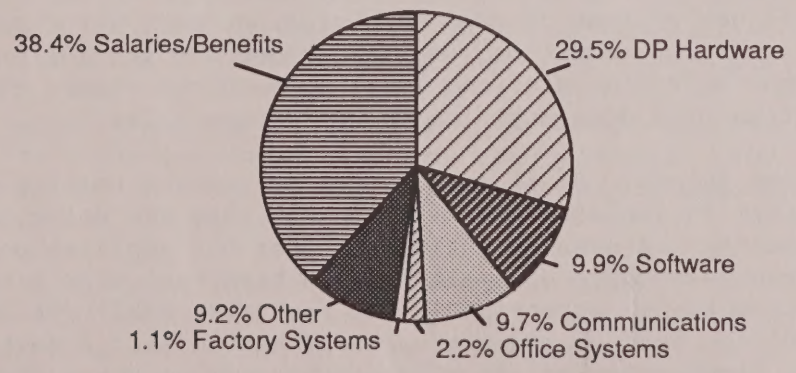

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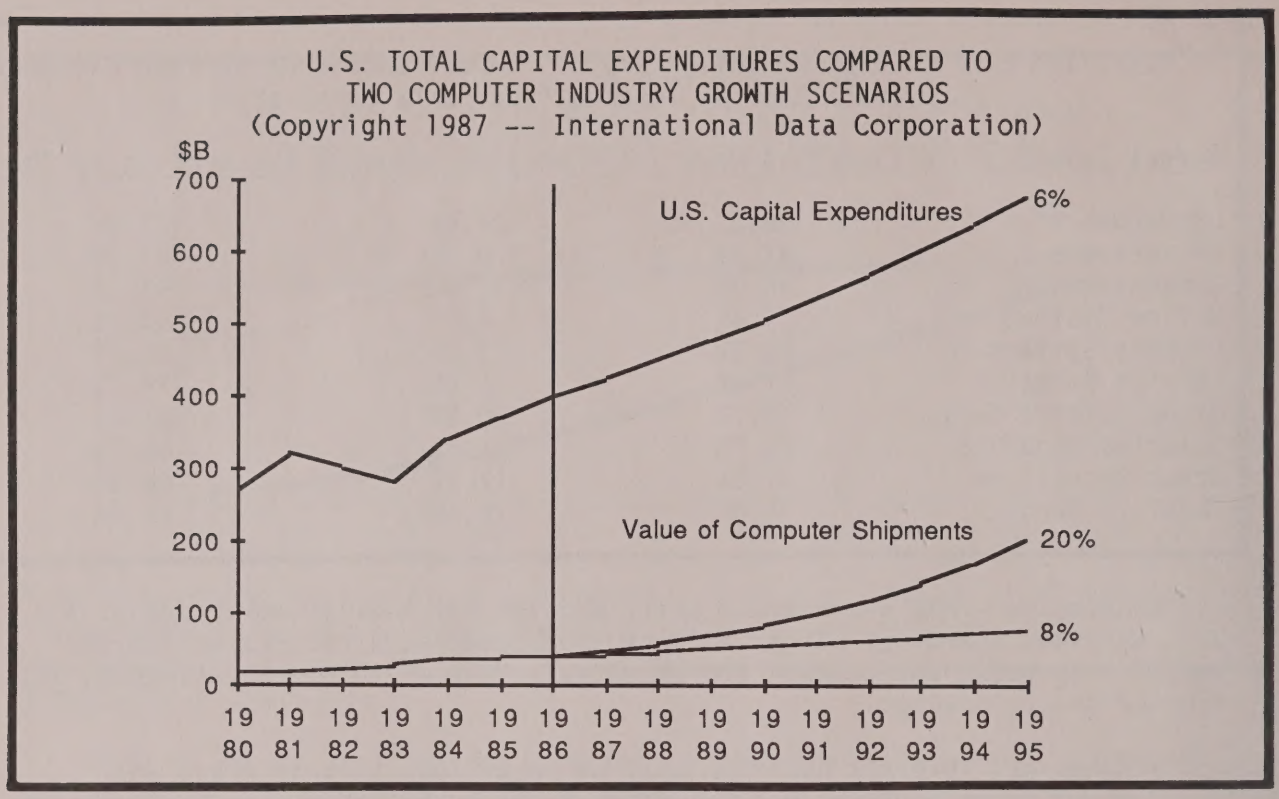

spending and spending on computer industry hardware. Nevertheless, computer hardware now accounts for some 15% of total U.S. capital spending, and it doesn't take an econometric model to see that there are limits to how high this number can grow. As the chart above shows, the U.S. government expects the nation's spending on capital equipment to grow at about 6% per year. If computer spending were to grow at sustained 20% rates for the next ten years (the value of U.S. hardware shipments was regularly growing 30% a year from 1982 through 1984), it would soak up about 30% of that spending. Clearly this is not very likely; the 8% line represents a much more believable path.

Mainframe Outlook Flat

Our last issue took an in-depth look at the troubles in IBM's mainframe business. But these can be summarized as follows:

Slowdown in MIPS consumption. Because many online systems have matured, the major systems in banks, insurance companies, government, etc., are only generating incremental demand. If mainframe demand is to expand, they will have to tap into new sources of demand. Unfortunately, new demand is coming in the area of end-user computing, and mainframes are getting precious little of this. Neither micro-to-mainframe links or mainframe-based office automation systems have done anything for mainframe sales.

Small systems impact. Small systems are in general not replacing mainframes (except in isolated cases), but what they are doing is siphoning off growth by dominating end-user computing and most new applications. The price/performance advantages of small systems have been widely touted, but what hasn't gotten enough attention is the fact that small systems are now the focus of much of the best of today's software development efforts. And since software drives hardware sales, it will be this new software that assures small systems future industry leadership.

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Lack of product differentiation. When 308X systems bowed in 1981, they had a new operating system, MVS/XA, and new disks, the 3380s, that didn't run on older 3033s. No such dramatic breaks have occurred with the 3090s, and the differentiating factors that have appeared (the vector facility and expanded storage) haven't proved enticing enough to obsolete the older 308X equipment.

Competition from used equipment. The result of the above is that sales of used 308X machines have been strong, and have seriously cut into demand for the smaller 3090s, the model 180 and model 150. Lack of momentum for the smaller machines is the main reason why IBM's unit sales have been flat.

Round One of Midrange System Battle: IBM and Digital

The question on everyone's mind seems to be whether IBM's new 9370s can right the giant's course and put the brakes on the Digital express. To boil this complex question down to a simple answer, it is IDC's view that the 9370 will slow IBM's loss, perhaps stem it entirely, but it is not likely to significantly reverse it. That will be a challenge for 1988 and beyond.

IDC estimates that IBM will sell some 4,000-6,000 9370s in the U.S. this year. The model mix could vary, but if one assumes an ASV of $150,000, sales of 5,000 boxes would generate $750 million in the U.S. A hefty figure to be sure, but a lot of it will clearly come at the expense of 4361 and 4381s, and to a lesser extent out of the hides of S/36s and S/38s. In terms of net new business to IBM, 50% of the above figure is probably a more reasonable bet.

When one considers that the current 9370 is targeted almost exclusively at IBM's largest customers who have big investments in 370 programs and expertise, such figures are not bad at all. But for the 9370 to do more and for it to really hurt Digital, new software is a must.

First, despite the 20-year hegemony of the 370 architecture, the amount of attractive end-user applications software is really not all that impressive. Additionally, IBM's office software under a VM environment has not been all that well received in the past, and the jury is still out on its current solution-pack offering. At the other end of the spectrum, IBM's major customers would like to see MVS/XA supported on the 9370 to allow for true applications portability, but currently only MVS/SP is offered.

Thus, with the 9370 threat manageable, there is little to prevent Digital from gaining market share again this year. As in 1986, gains will come at the expense of both IBM and its traditional mini rivals. But enough trees have fallen in praise of Digital already. There are at least a few weeds in the garden, and at the risk of seeming a spoilsport, we will focus on three:

Technical market challenge. The success of Apollo and Sun (and to a lesser extent the minisuper crowd) is threatening to make Unix an engineering scientific standard. Although Digital has sound Unix products, clearly the rise of Unix would be a long-term negative.

Dependence on Microvax II. If Digital is to continue to grow rapidly, it must expand its list of hot products. The great majority of the company's incremental growth in 1986 came from the MVII. Sales of the 8000 series products were OK, but not overwhelming, whereas the VAXmate has gotten off to a very slow start. The challenge in 1987 is to broaden the base of success.

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Improve cluster software. If the VAXcluster is to be a true mainframe alternative, a lot of software must be added (e.g., the Vax still lags as a transaction processing machine). Digital is said to be investing heavily in this area, but don't expect a rapid payback.

Personal Computers: The 386 is Important, But ...

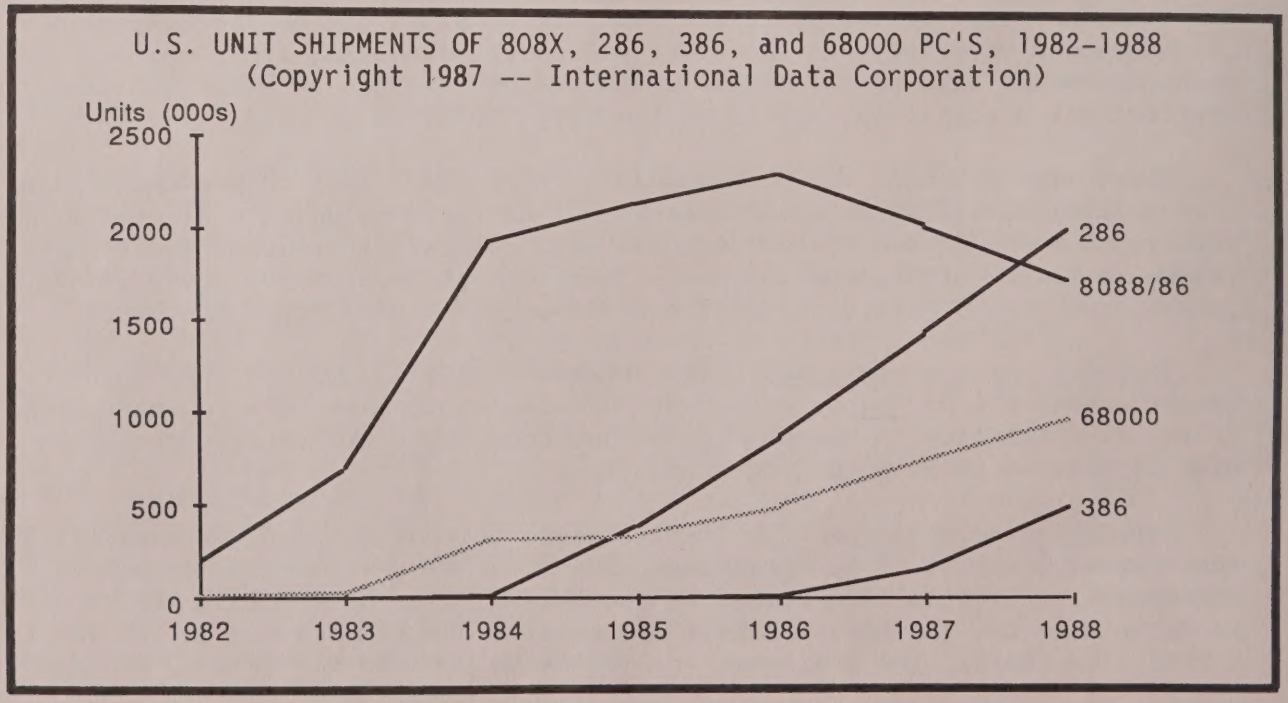
Although the 80386 is likely to be a workhorse industry engine for at least the next five years, its 1987 impact in terms of revenue will be small. IDC expects that 386-based systems will account for about 4-5% of business PC sales, enough to a lot for a vendor such as Compaq, but not enough to do much to the $14 billion U.S. PC industry.

Since it generally takes three to four years for a new microprocessor engine to achieve unit shipment leadership, it won't be until either late this year or early 1988 that more 286-based PCs are shipped than 808X products. If the 386 experiences a similar pattern, it will be king of the hill sometime around 1990. There are reasons to think that the 386 may be accepted faster than the 286, but the general historical pattern should hold.

Given this, the 386 by itself can't solve IBM's clone problem over the next couple of years. If IBM is going to throw any serious curves to the clone vendors, it will have to do it with 286, maybe even 808X PCs.

And then there's the MS-DOS/IBM operating system puzzle. In the Gray Sheet's 23-year history, few issues have generated so much speculation, and few vendor product decisions have had such obvious high stakes. Indeed, in terms of industry direction, perhaps the only rival to the current uncertainty was the original announcement of the 360 architecture back in 1964.

But keep in mind that new software often takes longer to build than planned, so don't expect anything earth-shattering for some time. 286-DOS isn't generating much excitement, and 386-DOS is years away. Don't be surprised if Unix makes a bid to fill the void.



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SELECTED INFORMATION INDUSTRY FINANCIAL RESULTS, FOURTH QUARTER 1986*
(Source: Company Financial Reports)

Company	4Q 1986 Revenue $M	4Q 1985 Revenue $M	% Change	4Q 1986 Earnings $M	4Q 1985 Earnings $M	% Change
Altos	40.4	36.0	+12.2	2.5	2.6	-3.8
Amdahl	336.8	257.2	+30.9	29.6	13.7	+115.9
Apollo	120.9	70.7	+71.0	5.3	.7	+623.6
Apple	662.3	533.9	+24.0	58.5	56.9	+2.7
Ask Computer Sys	21.2	19.1	+11.1	2.0	1.8	+8.5
ADP	334.2	290.3	+15.1	30.0	24.6	+22.0
Britton Lee	9.0	7.4	+21.6	.1	.4	-79.5
Burroughs-Unisys*	2,535.8	1,480.3	+168.5	(188.5)	115.3	-
Cipher Data	45.2	37.0	+22.3	1.0	1.0	-6.0
Comdisco	238.9	220.9	+8.2	8.0	23.5	-65.9
Compaq	186.9	156.3	+19.6	16.2	10.0	+62.3
CCI	41.3	25.6	+61.5	1.9	(27.6)	-
Computervision	136.5	117.2	+16.4	3.5	(21.8)	-
CDC w/o ComCrdt	903.6	981.4	-7.9	(224.9)	(267.5)	-
Convergent Tech	77.4	118.8	-34.9	(4.5)	6.3	-
Cray	138.2	84.7	+63.2	23.3	12.0	+94.2
Data General	313.3	293.7	+6.7	3.3	1.1	+200.0
Digital	2,271.8	1,862.5	+22.0	270.0	136.1	+98.3
Gould	227.4	233.2	-2.5	4.6	(65.1)	-
Intel	355.6	317.9	+11.9	(16.4)	(14.9)	-
Intergraph	157.4	155.5	+1.2	19.5	18.7	+4.5
IBM	16,945.0	17,155.0	-1.2	1,390.0	2,681.0	-48.2
Lotus	81.8	71.8	+13.9	15.6	11.4	+36.5
MSA	77.7	57.6	+34.8	13.0	10.0	+29.4
Mentor	49.3	36.6	+34.6	3.9	1.7	+137.5
Microsoft	81.0	50.0	+62.3	19.7	10.9	+79.9
Miniscribe	52.9	35.6	+48.5	6.4	2.5	+157.7
National Semi	456.8	349.2	+30.8	(5.7)	(38.3)	-
NBI	69.8	71.2	-2.0	(3.9)	.3	-
NCR	1,575.1	1,405.3	+12.1	134.1	133.2	+.6
Priam	31.1	33.8	-8.0	(33.8)	1.8	-
Prime	230.9	209.9	+10.0	14.2	17.5	-18.9
Seagate	251.9	101.0	+149.3	37.6	4.6	+461.5
Sperry*	-	1,402.5	-	-	67.9	-
StorageTek	184.3	168.6	+9.3	8.3	2.2	+273.3
Stratus	35.4	25.3	+39.9	3.7	3.0	+25.3
Sun	115.3	42.2	+173.3	8.5	1.7	+405.6
Tandem	238.0	170.1	+40.0	27.1	11.6	+132.6
Tandy	1,196.0	1,000.9	+19.5	103.8	87.1	+19.3
TI	1,335.8	1,208.8	+10.5	26.6	(41.2)	-
Ungermann-Bass	32.3	22.5	+43.6	2.0	1.6	+21.0
Wang	668.9	679.5	-1.6	(78.6)	21.7	-
Wyse	69.8	44.3	+57.5	4.7	3.5	+32.9
Xerox	3,700.0	3,300.0	+12.1	87.0	156.0	-
Sample Total*	36,633.2	34,941.2	+4.8	1,828.1	3,160.9	-42.2

*Burroughs-Unisys 4Q1986 revenue and income incorporate 100% of the Burroughs/ Sperry combo's intake, but the 1985 figures compare it only with Burroughs. Honeywell figures now do not include HIS and have therefore been dropped.

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(Source: Company Financial Reports)

Company	1986 Revenue $M	1985 Revenue $M	% Change	Earnings $M	Earnings $M	% Change
Altos	139.5	132.2	+5.5	7.7	9.8	-21.4
Amdahl	966.3	862.0	+12.1	41.8	28.7	+45.7
Apollo	391.7	295.6	+32.5	9.3	(1.5)	-
Apple	2,030.3	1,753.9	+15.8	155.5	72.0	+115.9
Ask Computer Sys	85.7	71.8	+19.4	7.1	6.6	+6.9
ADP	1,298.1	1,102.1	+17.8	115.5	95.3	+21.2
Britton Lee	31.5	29.1	+8.3	.1	2.9	-95.3
Burroughs-Unisys*	7,432.4	5,037.7	+147.5	(43.4)	248.2	-
Cipher Data	180.8	152.6	+18.5	7.6	7.9	-4.6
Comdisco	915.8	670.7	+36.6	63.3	64.6	-2.0
Compaq	625.2	503.9	+24.1	42.9	26.6	+61.3
CCI	129.6	111.9	+15.8	(3.0)	(41.9)	-
Computervision	494.7	441.1	+12.1	(5.8)	(80.8)	-
CDC w/o ComCrdt	3,346.7	3,679.7	-9.0	(307.1)	(562.7)	-
Convergent Tech	305.8	459.3	-33.4	(32.8)	13.2	-
Cray	596.7	380.2	+56.9	124.8	75.6	+65.1
Data General	1,287.5	1,198.9	+7.4	(26.8)	2.4	-
Digital	8,414.2	7,029.4	+19.7	841.6	400.6	+110.1
Gould	908.8	923.2	-1.6	(101.8)	(175.7)	-
Intel	1,265.0	1,365.0	-7.3	(173.2)	1.6	-
Intergraph	605.7	526.4	+15.1	70.4	67.8	+3.8
IBM	51,250.0	50,056.0	+2.4	4,789.0	6,555.0	-26.9
Lotus	282.9	225.5	+25.4	48.3	38.2	+26.6
MSA	193.4	151.7	+27.6	18.7	6.9	+173.2
Mentor	173.5	136.7	+26.9	11.0	8.0	+37.7
Microsoft	260.2	162.6	+60.0	57.7	31.2	+84.6
Miniscribe	184.9	114.0	+62.2	22.7	(16.8)	-
National Semi	1,684.6	1,581.1	+6.5	(46.2)	(46.2)	0.0
NBI	283.1	260.7	+8.6	(9.9)	7.9	-
NCR	4,881.6	4,317.2	+13.1	336.5	315.2	+6.8
Priam	123.0	118.2	+4.1	(40.6)	(9.9)	-
Prime	860.2	769.7	+11.8	46.9	57.8	-18.8
Seagate	709.4	303.6	+133.6	90.3	8.7	+936.7
Sperry*	3,056.5	5,526.9	-44.7	122.1	37.4	+226.5
StorageTek	696.0	673.4	+3.4	36.2	(57.4)	-
Stratus	124.6	80.2	+55.4	13.5	8.6	+56.9
Sun	341.1	147.1	+131.9	24.5	8.0	+207.1
Tandem	835.7	634.6	+31.7	79.2	31.9	+147.9
Tandy*	3,322.8	2,858.7	+16.2	216.4	203.9	+6.2
TI	4,974.0	4,924.5	+1.0	29.1	(118.7)	-
Ungermann-Bass	110.9	72.2	+53.7	0.0	3.7	-99.5
Wang	2,688.9	2,428.3	+9.9	(86.4)	(62.9)	-
Wyse	228.4	155.4	+46.9	16.7	10.5	+58.5
Xerox	12,900.0	11,700.0	+10.3	465.0	475.0	-2.1
Sample Total*	121,597.7	114,124.6	+6.5	7,034.6	7,757.2	-9.3

*The 1986 totals are undercounted by half of two months' Sperry revenue and income; Tandy revenue restated to reflect spinoff of foreign retail operations; Honeywell figures now do not include HIS and have therefore been dropped.

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REVIEW & FORECAST PART I

THE GRAY SHEET
Computer Industry
REPORT

D.C.BELLOMY, EDITOR February 27, 1987 • VOL.22,NO.19-20 P.J.MCGOVERN, PUBLISHER

Large-Scale Review and Forecast -- Page 4

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THE TWO-YEAR ITCH: IBM'S NEW SIERRA MODELS AND MID-LIFE KICKERS

"As a mid-life kicker, it was just a nudge. Numbers in the 5-14% range sound more like price cuts than performance increases, and that's effectively what this latest IBM announcement seems to be, a price cut cloaked in new hardware."

It's deja vu all over again. That lead paragraph appeared in the Gray Sheet almost exactly three years ago (February 29, 1984) in a story about the -X models of the 308X family. There are, though, three differences worthy of note between February 1984 and the January 25 announcement of 3090E models:

- The Sierra E models appear considerably earlier in the life cycle of an IBM mainframe generation.

IBM 3081s had been shipping since 1981 without the benefit of an X at the end, and the -X models antedated the announcement of the 3090s by only one year. The new E models were announced just two years after the 3090s were unveiled, and a year and a half after the 200 shipped. IBM has intimated that the next "Summit" generation of mainframes will not appear until 1990 or so, although the Gray Sheet would not be surprised if a 1989 introduction occurs.

- IBM did not use the 1984 -X announcement to fill in large gaps in 308Xdom, while the 1987 3090E announcement included two new models.

This is a corollary of the first point. By the time the X models were announced, the 308X family lacked only the baby in the family: the superfluous 3083-CX entry-level system. The E models, though, include two entirely new systems, the high-end six-CPU 3090-600E and the triadic 300E.

- This time IBM did a little more than cloak a price cut in new hardware: there were actual minor price cuts for the 150/150E (3%) and the 400/400E (1.5%) besides the performance enhancements.

All of which is probably just another way of saying that the announcement of 308X-X models came on the heels of a year that saw 37% growth in IBM's large-scale revenue, and ushered in a year that would see 9% growth. The 3090 E models, on the other hand, must contend with large-scale IBM growth in 1986 of only 3%, and the strong possibility that IBM will have to fight in 1987 to maintain a similar growth rate.

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The timing also suggests that this will not be the last "mid-life kicker" that the 3090s receive. Further down the road there will probably be channel speed extensions (this spring perhaps?), and likely enhancements to the core CPU. The danger for IBM would be if users become blasé about enhancement announcements and decline to feel "kicked," but the current growth rates are already so low that IBM seemingly has very little to lose by experimenting.

The "E" Enhancements

There are minor differences in how IBM achieved the performance boosts for the 308X-X and for the 3090-E models, but the scope is about the same. In 1984, the six new -X models cut cycle time 8%, used three fewer TCMs, and merged a few internal parts. The 3090E improvements, which also cut cycle time 8% on fully tuned models, primarily depend on:

- Second-generation megabit chips in central storage that take only 80ns to access data, almost twice as fast as their predecessors. IBM has been using megabit chips in the 3090s since last spring, but the chief benefit of the first generation was saving space that hasn't been used for anything else (the second-generation chip also takes up a third less space than its forefather).

- A redesigned ceramic substrate enclosing the TCM module that allows it to be a third denser. Higher chip density in the TCM allows more efficient dissipation of heat and hence higher reliability.

In addition to the familywide enhancements, the 200E and 400E offer optional enhancements over their predecessors in central storage (up to 128MB for the 200E, 256MB for the 400E), expanded storage (up to 512MB and 1,024MB), and channels (up to 64 and 128).

Compared to their predecessors, the price/performance gain at base price for the midpoint of commercial performance is only 5% for the 3090-150E (8% if the price prior to January 26 is used), but between 12% and 13% for the 180E, 200E, and 400E (13.5% for the 400E against the pre-January 26 price of a 400). These ratios are a little higher than for the 308X-X models, where the price/performance gains in February 1984 fell in a range between 5% and 11%.

Readers may recall that IBM miffed some of its 308X installed base in 1984 by not allowing upgrades to -X models. Three months later, IBM had to announce a performance improvement feature for earlier 308X systems that, for $11,000, enabled them to achieve a 6% improvement in the instruction execution rate, which was almost equivalent to what the -X models could offer.

This time field upgrades for installed 3090s to the next higher E model (e.g., a 180 to a 200E) will be permitted. In fact, anything on order on January 26, and new orders on the replacement models through May, will be filled with the old models and then upgraded to full E capacity in May. IBM, though, would prefer not to offer anything for the pre-E 3090 base comparable to the May 1984 offering, since it would like to give MIPS-thirsty users only one option: upgrade to the next higher model for much more cash than $11,000.

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PRICE/PERFORMANCE OF 3090 AND 3090E MODELS, JANUARY 1987
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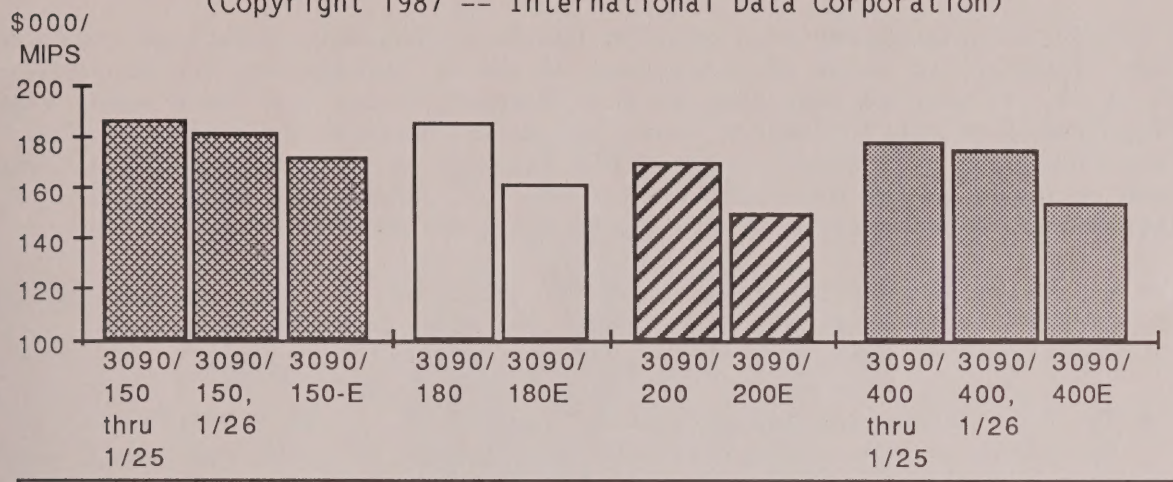

Prices for base models with processor prerequisites; MIPS should be understood as a conversion factor representing the midpoint of commercial performance ranges as announced by IBM.

New Models: The 300E and 600E

With the introduction of three-way and six-way systems to the 3090 line, IBM has effectively filled out the Sierra range of mainframes. The task of running any additional CPUs in tandem with a single image is apparently beyond the current capacity of IBM's operating systems.

IBM rates 600E commercial performance at an increment of about 55% over a 400, or 36% over a 400E. The 600E has six processors rather than the 400E's four, but in other respects it is currently linked to the new maximums for the 400E: i.e., 128 channels, 256MB of central storage, and 1,024MB of expanded storage. With an announced base price of $11.7 million (with processor prereqs), the 600E is currently scheduled for delivery in the third quarter.

The 300E physically is simply half a 600E, and will be available at the same time starting at $6.2 million. IBM is rating the 300E at about 60% better in commercial performance than a 3090-200, or a little over 40% better than a 200E. It will have the same maximums in channels and storage as a 200E.

CHARACTERISTICS OF THE NEW 3090 FAMILY
(Source: IBM Statements and IDC Estimates)

	3090-150E	3090-180E	3090-200E	3090-300E	3090-400E	3090-600E
# CPU	1	1	2	3	4	6
Shipped	5/1/87	5/1/87	5/1/87	3Q 87	5/1/87	3Q 87
MIPS*	9.9	16.5	30.8	43.5	55.8	76.0
List Price $	1,696,900	2,646,900	4,584,000	6,234,900	8,542,785	11,667,785
$/MIPS*	171,400	160,420	148,860	143,300	153,100	153,520
Main Memory	32-64MB	32-64MB	64-128MB	64-128MB	128-256MB	128-256MB
Exp.Stor.Opt.	64-128MB	64-256MB	64-512MB	64-512MB	128-1024MB	128-1024MB
Channels	16-24	16-32	32-64	32-64	64-128	64-128
Upgrade to	180E	200E	300E,400E	400E,600E	600E	-

*MIPS = IDC estimate based on commercial performance comparisons by IBM.

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THERE'S A WHOLE WORLD OUT THERE FOR LARGE-SCALE SYSTEMS -- THANK GOODNESS

The February 22 agreement to stabilize the major industrial nations' currencies -- specifically, to check the shrinkage of the dollar against the Deutschmark, Yen, et al. -- took so long because U.S. Treasury Secretary James Baker kept giving "What, me worry?" smiles about the situation. As a bargaining ploy, it worked; but even as economic policy, his equanimity could be justified. What growth occurred in the mainframe market for U.S. vendors in 1986 was due primarily to the conversion of foreign sales into American dollars.

- Worldwide large-scale revenue of $17.5 billion for U.S. vendors in 1986 represented growth of nearly 3.5%, down from the 6% growth registered in 1985, the first year of the Great Softness.

- The U.S. market was actually down almost 4.5%, to $8.9 billion -- the first decline since 1981, during the wait for 308X systems.

- Meanwhile international large-scale revenue for U.S. vendors bulged to a currency-swollen $8.7 billion, for a growth rate of nearly 13%.

- Worldwide unit shipments of large-scale systems slipped 5.5% in 1986, from 3,270 to 3,090 systems.*

- As additional testimony to the effect of currency conversions (as well as to different migration routes during IBM's uneasy mainframe transition), U.S. unit shipments actually were up 4%, to 1,700 systems.

The disproportionate growth rates for U.S. and international shipments are actually two sides of the same coin. There are other reasons for the slack U.S. market for large-scale systems (see below), but IBM's incessant harping on the weak U.S. demand for big-ticket capital goods is more than just scapegoat-hunting. The steady but minuscule growth of the U.S. economy over the past few years has been enough to ease pressure on the Reagan administration, but apparently not enough to persuade American corporate managers that the underlying economic situation and potential are sufficiently strong to merit multimillion-dollar investments now for future computing needs.

These same doubts, though, have helped create the surge in foreign currencies against the dollar and the attendant revenue gains for U.S. mainframe companies (recall that around 75% of the European market for large-scale systems, and around a third of the Japanese, have belonged to U.S. vendors). Not that it all comes out in the wash, but the world economy's complex interrelationships in 1986 kept U.S. large-scale vendors from getting taken to the cleaners.

When making projections about market growth, the Gray Sheet and IDC do not presume to prognosticate about inflationary and currency trends. In terms of 1986 dollar values, we currently project a compound annual growth rate of only 3% for the value of worldwide large-scale shipments 1986-91, and 2% for the U.S. This follows 23% growth worldwide (18% in the U.S.) for 1981-86.

*If you suspect something preternatural about these figures, consider this: The 3,090 total popped up on our spreadsheet after the figures for U.S. and international shipments were rounded off. If they hadn't been rounded, the 1986 total would have been 3,084. And they say Rod Serling's dead.

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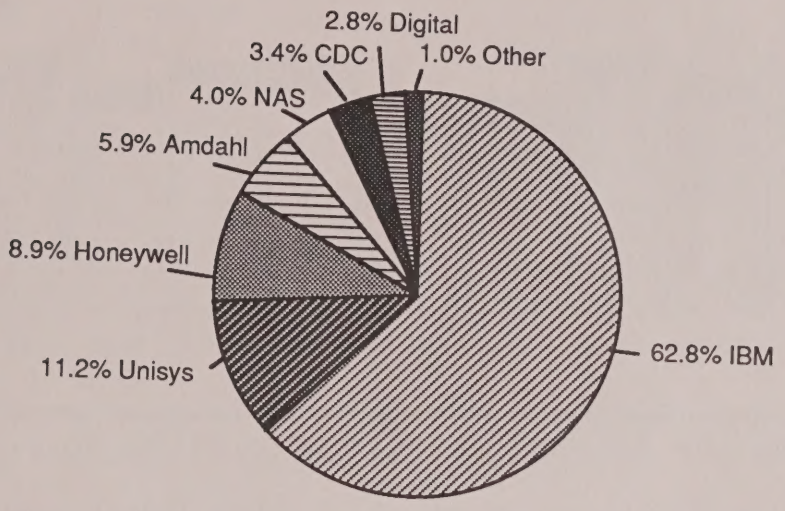
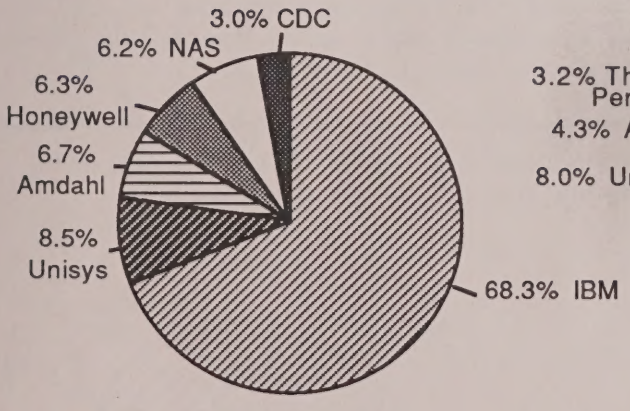
WORLDWIDE MARKET SHARES OF U.S.-BASED VENDORS' INSTALLED BASE (UNITS)
OF LARGE-SCALE SYSTEMS, 1/1/1987
(Copyright 1987 -- International Data Corporation)

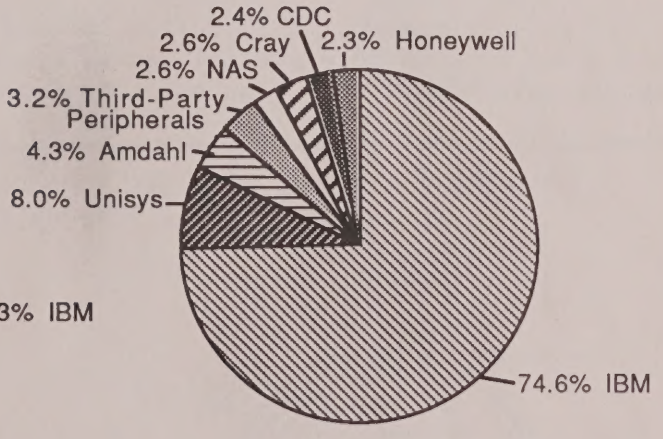


21,560 Systems

1986 WORLDWIDE MARKET SHARES OF LARGE-SCALE SHIPMENTS BY U.S.-BASED VENDORS
UNITS (LEFT) AND DOLLAR VALUE (RIGHT)



1.1% Cray
Too Small To Show



.1% Digital
Too Small To Show

3,090 Systems

$17.55 Billion

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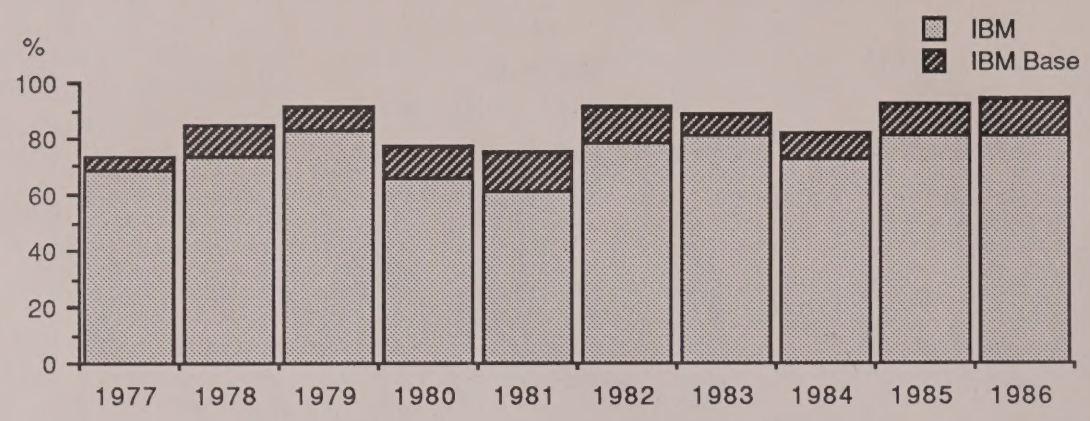
PERCENTAGE OF IBM AND IBM-COMPATIBLE SYSTEMS IN WORLDWIDE LARGE-SCALE UNIT SHIPMENTS, 1977-1986
(Copyright 1987 -- International Data Corporation)



IBM and the PCMs: The Pie Isn't Growing, but the Slices Change Some

On the subject of deja vu, for all the problems that IBM has encountered with the Sierra transition, the share of large-scale unit shipments and the value of shipments held by IBM and PCMs both grew slightly in 1986:

- Unit shipments to the IBM base reached as high a market share (over 81% of all shipments) as they have held since 1979.
- The value of shipments to the IBM base inched up 4%, compared to 3% growth for all large-scale systems, and also reached its highest market share of the 1980s: 81.5%.

In part this stability occurred because the PCMs took up some of IBM's slack, but an even more crucial factor was that, when users don't buy IBM-compatible mainframes, they tend not to buy anything else either.

IBM WORLDWIDE LARGE-SCALE UNIT SHIPMENTS BY FAMILIES, 1985 AND 1986
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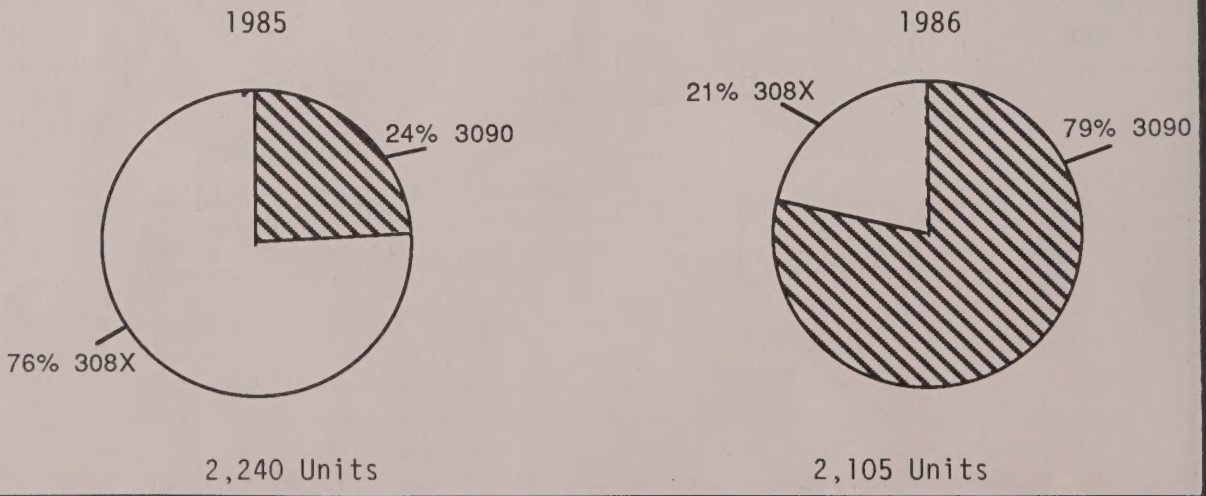

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IBM WORLDWIDE LARGE-SCALE INSTALLED BASE BY SYSTEM FAMILY, 1981-1986
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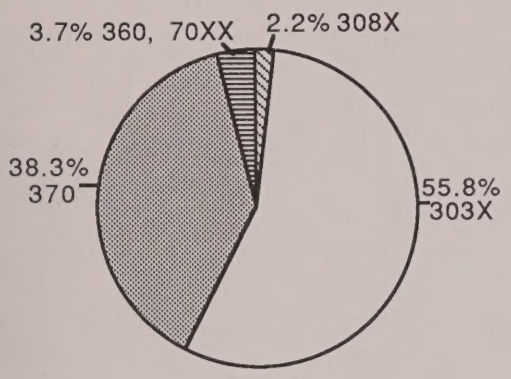
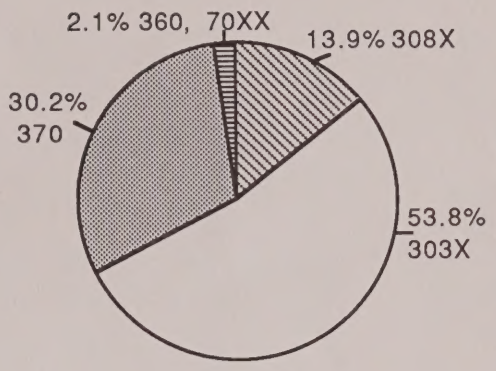
1981



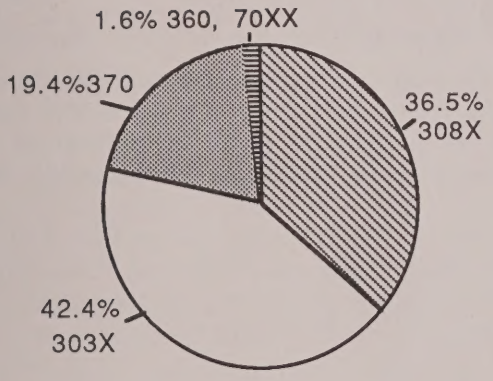
9,105 Systems

1982



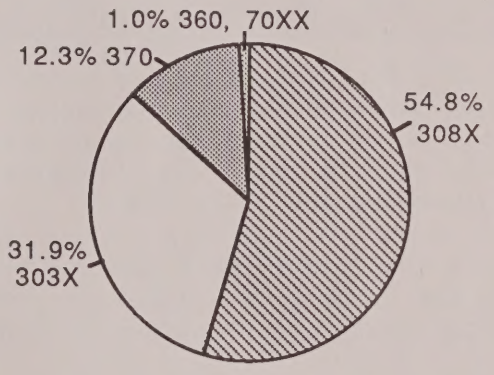
9,340 Systems

1983



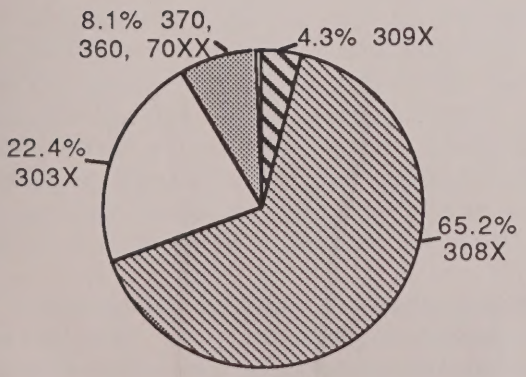
10,300 Systems

1984



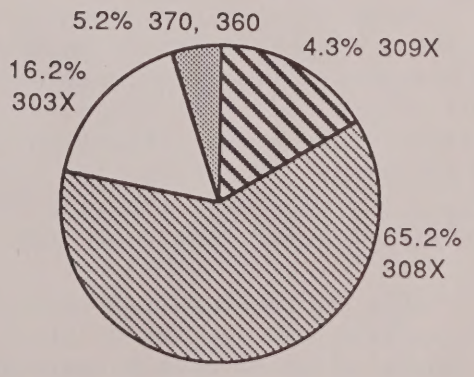
11,485 Systems

1985



12,275 Systems

1986



13,540 Systems

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WORLDWIDE VALUE OF SHIPMENTS, LARGE-SCALE SYSTEMS 1982-1986
(Copyright 1987 -- International Data Corporation)

	1982		1983		1984		1985		1986	
	$M	% Mkt	$M	% Mkt	$M	% Mkt	$M	% Mkt	$M	% Mkt
IBM Base	8,470	76.0%	11,640	80.3%	12,750	79.5%	13,770	81.1%	14,300	81.5%
IBM	7,900	70.9%	10,760	74.2%	11,750	73.2%	12,720	75.0%	13,100	74.6%
Amdahl	350	3.1%	590	4.1%	660	4.1%	690	4.1%	750	4.3%
NAS	220	2.0%	290	2.0%	340	2.1%	360	2.1%	450	2.6%
Non-IBM	1,820	16.3%	2,150	14.8%	2,575	16.0%	2,680	15.8%	2,690	15.3%
Unisys										
Burroughs	400	3.6%	530	3.7%	900	5.6%	820	4.8%	750	4.3%
Sperry	430	3.9%	420	2.9%	510	3.2%	790	4.7%	650	3.7%
Cray	120	1.1%	130	.9%	165	1.0%	240	1.4%	450	2.6%
CDC	390	3.5%	470	3.2%	480	3.0%	350	2.1%	420	2.4%
Honeywell	200	1.8%	430	3.0%	430	2.7%	460	2.7%	410	2.3%
Digital	280	2.5%	170	1.2%	90	.6%	20	.1%	10	.1%
Third-Party Peripherals	850	7.6%	710	4.9%	720	4.5%	520	3.1%	560	3.2%
Total	11,140		14,500		16,045		16,970		17,550	

IBM. At first glance it looks like your average, predictable mainframe product transition. In 1985, with only one Sierra model available, 3090s comprised 24% of large-scale unit shipments from IBM, and the well-established 308X's 76%. In 1986, the figures were reversed: four 3090 models totaled 79% of shipments, and 308Xs 21%.

But that's only what IBM was shipping, not what users wanted and were buying. The January 1987 IBM Buying Intentions Survey by IDC's Market Analysis and Statistics Group tells a very different and, for IBM, troubling story:

- When asked how many and what kind of mainframes they planned to acquire in the next six months, respondents were actually much more likely to want 308Xs than 3090s.

- When asked what they might acquire, the situation is very different, with 3090s holding a better than 2-to-1 advantage over 308Xs.

But a wish list isn't the same thing as a signature on the bottom line. And the bottom line that gets signed for those 308Xs is often not going to be IBM's, since most will be going out from the used computer lots (hence the discrepancy between user intentions and IBM's product mix). Obviously intentions can be changed; moreover, the survey was conducted before the January announcements. Nevertheless, the mix between new and old mainframe families in users' acquisition plans should be quite different in a successful transition.

Which, to thoroughly pummel a defunct steed, the 3090 transition hasn't been. Fewer IBM systems shipped needn't be viewed negatively, but 3% growth in the value of shipments meant a slight dip in IBM's large-scale market share. The sharp drop in large-scale storage revenue contributed to the poor showing, but most if not all processor growth can be attributed to currency conversion.

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WORLDWIDE VALUE OF SHIPMENTS, ALL MULTIUSER SYSTEMS, 1982-1986
(Copyright 1987 -- International Data Corporation)

	1982		1983		1984		1985		1986	
	$M	% Mkt	$M	% Mkt	$M	% Mkt	$M	% Mkt	$M	% Mkt
IBM	13,320	45.4%	15,130	44.7%	18,420	45.4%	20,160	45.9%	20,200	44.3%
Digital	2,670	9.1%	2,590	7.7%	3,810	9.4%	4,270	9.7%	5,020	11.0%
Unisys										
Burroughs	1,110	3.8%	1,380	4.1%	2,130	5.3%	2,100	4.8%	2,280	5.0%
Sperry	1,130	3.9%	1,100	3.3%	1,040	2.6%	1,610	3.7%	1,300	2.9%
HP	1,000	3.4%	1,390	4.1%	1,570	3.9%	1,670	3.8%	1,730	3.8%
Honeywell	790	2.7%	1,120	3.3%	1,070	2.6%	1,100	2.5%	1,080	2.4%
NCR	420	1.4%	420	1.2%	780	1.9%	870	2.0%	1,060	2.3%
Wang	520	1.8%	540	1.6%	540	1.3%	780	1.8%	930	2.0%
Data General	490	1.7%	720	2.1%	830	2.0%	820	1.9%	790	1.7%
Amdahl	350	1.2%	590	1.7%	660	1.6%	690	1.6%	750	1.6%
Tandem	250	.9%	350	1.0%	450	1.1%	520	1.2%	650	1.4%
Prime	360	1.2%	390	1.2%	420	1.0%	570	1.3%	610	1.3%
Other, Third-Party Per.	6,930	23.6%	8,110	24.0%	8,825	21.8%	8,740	19.9%	9,180	20.1%
Total	29,340		33,830		40,545		43,900		45,580	

So why aren't users flocking to buy 3090s? Respondents to the Buying Intentions Survey who were not acquiring mainframes or were not sure about their plans were asked how come. The most cited response among the choices offered, with over three times as many votes as the runner-up, was that the user had sufficient mainframe power for the next twelve months.

The runner-up position was held by "We are still assessing our future mainframe CPU requirements." There were also scattered votes for, in descending order, the ever-popular "don't know"; needing additional mainframe power but facing budgetary restraints; enhancing the current CPU rather than acquiring a new one; and choosing to invest instead in smaller, distributed systems.

The MIPS surfeit that the Gray Sheet first discussed last summer (Vol. 22, No. 6, July 23, 1986) is a question of perception as much as fact. It is possible that it may be ebbing, since over 80% of the respondents to the June 1986 survey said they were declining to acquire Sierra-class systems because they already had sufficient mainframe power for the next year, while about half of the responses to the most recent survey cited the MIPS issue. However, last summer's survey did not permit multiple responses to the question, while the new one did.

PCMs. The me-too vendors did fine, thank you, in 1986. Amdahl might have had to wipe some perspiration from its brow after finally registering strong growth in the fourth quarter, but NAS had a bullish year from snow to snow.

One reason for NAS's strong growth was that it had an essentially full line of Sierra-class models, and Amdahl did not. It is interesting to note that Amdahl felt that it had to initiate its own line of enhanced "E" models after IBM did, but NAS has not and seems to prefer not to, at least for now. NAS this time can apparently afford to wait and see.

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PROPORTION OF THE VALUE OF U.S. LARGE-SCALE TO ALL U.S. SHIPMENTS, 1980-86
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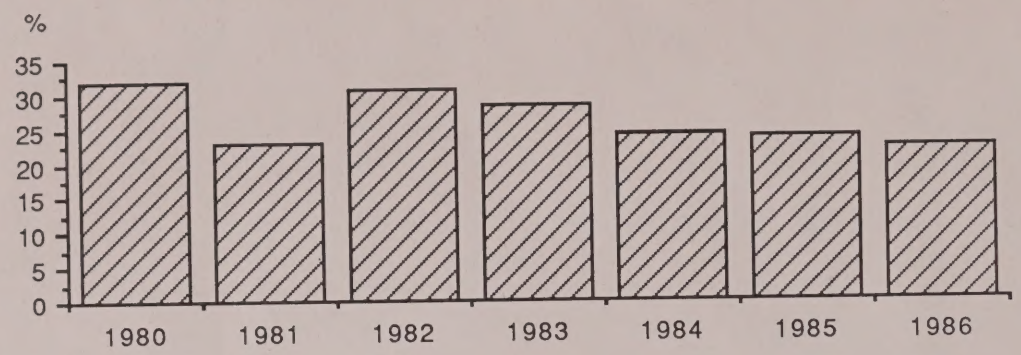

It should be noted that much of NAS's growth in 1986 was international rather than in the U.S., and it's not just currency conversion -- NAS had significantly more international unit shipments than U.S. Indeed, the U.S. total fell 14% from 1985, while the international total rose 55%. As the major international marketing arm for Hitachi-designed mainframes, NAS has had an advantage over Amdahl, which has had to compete with Fujitsu and Siemens. The creation of Comparex in January of 1987 as an outlet for Hitachi PCM systems in Europe should complicate this arrangement for both U.S. PCM vendors

The other source of NAS strength in 1986, and what kept Amdahl revenue flat when a dearth of competitive systems could have spelled sharply lower sales, was PCM (i.e., Japanese) success in competing with IBM in storage.

The Bunch Stutter while Supercomputers Lead Growth

A lot of things happened in the Bunch in 1986, but large-scale rejuvenation wasn't one of them. Three of the four mainframe players in the group not only lost market share, but fell in the value of shipments -- Burroughs by some 8.5%, Honeywell by around 11%, and Sperry by as much as 18%. In part this decline can be attributed to product cycles, but another reason seems to have been the disinclination to look towards Bunch vendors for mainframes in a time of uncertainty. Too many things were happening in the Bunch. The Unisys merger of Burroughs and Sperry, and the spinoff of Honeywell Information Systems in a so-far unnamed new entity owned by Bull, Honeywell, and NEC may eventually lead to large-scale growth, but not in the short run.

Remember learning about how Turkey used to be called the "Sick Man of Europe"? It was CDC, the "Sick Man of the Bunch," that grew 20% in the value of large-scale system shipments last year. Of course, this occurred after shipments fell 27% in value in 1985, and the $420 million in large-scale revenue for 1986 still leaves CDC $50 million shy of its 1983 take. However, it is at least, at last, moving in the right direction again.

In last year's Review and Forecast issue for large-scale systems (Vol. 21, No. 22-23, March 28, 1986), the Gray Sheet opined that, "If Cray continues to grow at [its 1985] pace in 1986, and CDC manages not to lose anymore ground, the two companies will be tied at around $350 million by year's end." We underestimated both CDC and Cray. CDC did more than "not lose any more ground," but Cray almost doubled the value of its shipments. At $450 million, it was tied with NAS in the large-scale category and edged out both CDC and Honeywell.

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LARGE-SCALE COMPUTER MARKET -- U.S.-BASED MANUFACTURERS
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	Number of Systems Shipped	Cumulative Number in Use	$ Million Value Shipped	$ Billion Value in Use
		WORLDWIDE		
1981	1,470	14,490	6,150	61.8
1982	2,280	15,190	11,140	68.3
1983	3,370	16,700	14,460	78.8
1984	4,010	18,640	16,045	89.1
1985	3,270	19,780	16,970	97.2
1986	3,090	21,560	17,550	106.0
1987	3,400	23,120	18,060	114.9
1988	3,650	24,750	18,700	124.0
1989	3,270	26,290	18,500	133.0
1990	3,450	27,810	19,450	142.5
1991	3,800	29,600	20,160	152.3
	4.2% ACGR	UNITED STATES		
1981	890	8,350	3,890	36.3
1982	1,490	8,830	6,810	41.1
1983	1,840	9,590	8,150	46.3
1984	2,410	10,860	8,965	52.3
1985	1,630	11,270	9,290	57.1
1986	1,700	12,350	8,880	61.6
1987	1,850	13,170	8,960	66.1
1988	2,000	14,050	9,300	70.7
1989	1,670	14,790	9,000	75.2
1990	1,750	15,560	9,550	79.8
1991	1,900	16,400	9,860	84.8
		INTERNATIONAL		
1981	580	6,140	2,260	25.5
1982	790	6,360	4,330	27.2
1983	1,530	7,110	6,310	32.5
1984	1,600	7,780	7,080	36.8
1985	1,640	8,510	7,680	40.1
1986	1,390	9,210	8,670	44.4
1987	1,550	9,950	9,100	48.8
1988	1,650	10,700	9,400	53.3
1989	1,600	11,500	9,500	57.8
1990	1,700	12,250	9,900	62.7
1991	1,900	13,200	10,300	67.5

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COMPUTER MARKET SUMMARY -- U.S.-BASED MANUFACTURERS*
(Copyright 1987 -- International Data Corporation)

	Number of Systems Shipped	Cumulative Number in Use	$ Million Value Shipped	$ Billion Value in Use
		WORLDWIDE		
1981	1,269,420	3,384,380	26,817	148.9
1982	4,238,520	7,575,900	34,698	175.1
1983	7,485,910	15,018,070	45,134	208.7
1984	10,057,690	25,008,570	57,713	251.5
1985	9,220,770	34,146,570	62,970	293.3
1986	10,094,960	44,141,940	66,340	341.5
1987	10,444,400	52,908,370	71,710	389.4
1988	11,427,650	61,893,630	77,820	439.0
1989	12,011,370	70,725,970	81,850	483.6
1990	12,110,950	79,020,840	87,130	534.1
1991	12,126,800	86,717,430	91,760	588.1
		UNITED STATES		
1981	882,830	2,404,120	16,935	86.4
1982	3,196,170	5,570,370	22,290	104.1
1983	5,609,170	11,151,340	28,794	126.2
1984	6,852,090	17,960,920	37,127	154.7
1985	5,861,360	23,770,090	38,962	181.9
1986	6,595,170	30,300,580	39,550	210.1
1987	6,665,850	35,667,370	42,560	239.6
1988	7,194,000	41,066,950	46,300	269.8
1989	7,694,670	46,459,290	48,350	295.6
1990	7,838,750	51,563,660	51,350	325.3
1980	7,901,900	56,316,500	54,260	357.7
		INTERNATIONAL		
1981	386,590	980,260	9,882	62.5
1982	1,042,350	2,005,530	12,408	71.0
1983	1,876,740	3,866,730	16,340	82.5
1984	3,205,600	7,047,650	20,586	96.8
1985	3,359,410	10,376,480	24,008	111.4
1986	3,499,790	13,841,360	26,790	131.4
1987	3,778,550	17,241,000	29,150	149.8
1988	4,233,650	20,826,680	31,520	169.2
1989	4,316,700	24,266,680	33,500	188.0
1990	4,272,200	27,457,180	35,780	208.8
1980	4,224,900	30,400,930	37,500	230.4

*Dollar values merge PC retail sales with multiuser manufacturer revenue.

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IBM WITHOUT STEROIDS: WHAT THE ANNUAL REPORT SAYS ABOUT 1986

The plain and simple truth is that IBM hasn't had a year like this since the computer revolution commenced in earnest. The gross contours of the year were reasonably clear long before the results for 1986 were announced, for there was never a realistic chance that IBM could repeat its fourth quarter results of 1985. When IBM's engine continued to sputter through the second and third quarters of 1986, it couldn't shift into Sierra gear for the last three months as it had the previous year.

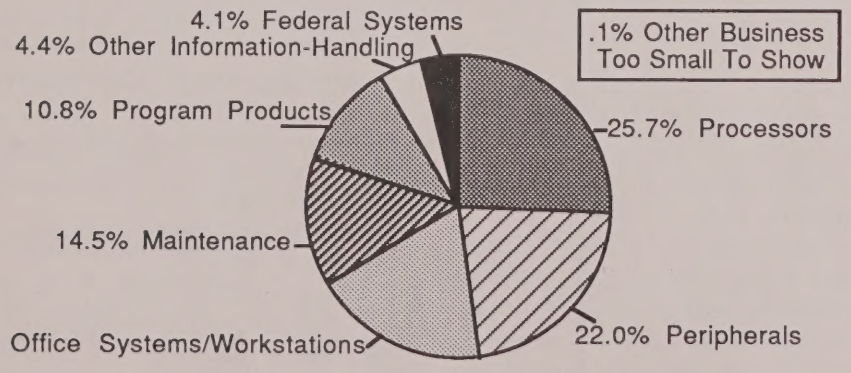
But what went wrong, and what went right? It's more than a question of forensic medicine. For well-known reasons, a number of industry participants approach IBM's travails like democrats skimming through the Tower Report, but with the same uneasy feeling in the pits of their stomachs about what the shared future now holds. The Gray Sheet therefore pored over IBM's annual report with more than its usual interest in search of clues and portents. The details, though, were often even more dismal than the broad brushstrokes in the original press release.

ITEM - One hinge on which the door closed on 1986 revenue was sales. The other three categories continued recent trends. Maintenance services, which were up nearly 16% in revenue in 1985, rose an even more robust 21.5% in 1986. The 30% growth in software revenue in 1985 was followed by 32% growth. Rentals and other services dipped 25% in 1986, but then they had swooped 30% downward in 1985.

But sales, which comprise some two thirds of IBM's revenue, did not keep step. After rising nearly 16%, in the first year of the Great Softness, they fell nearly half a percentage point. Instead of continuing to rise, the share of IBM's revenue accounted for by sales, which had been 65% in 1984 and 69% in 1985, slipped back to 67%.

The drop in sales was widespread. In fact, IBM lost market share in all four of IDC's processor categories -- PCs, large, medium, and small systems. In each case the causes are different, but the cumulative effects were dramatic, and not easily reversed.

IBM 1986 REVENUE BY BUSINESS SEGMENTS
(Source: IBM Annual Report)



$51.25 Billion

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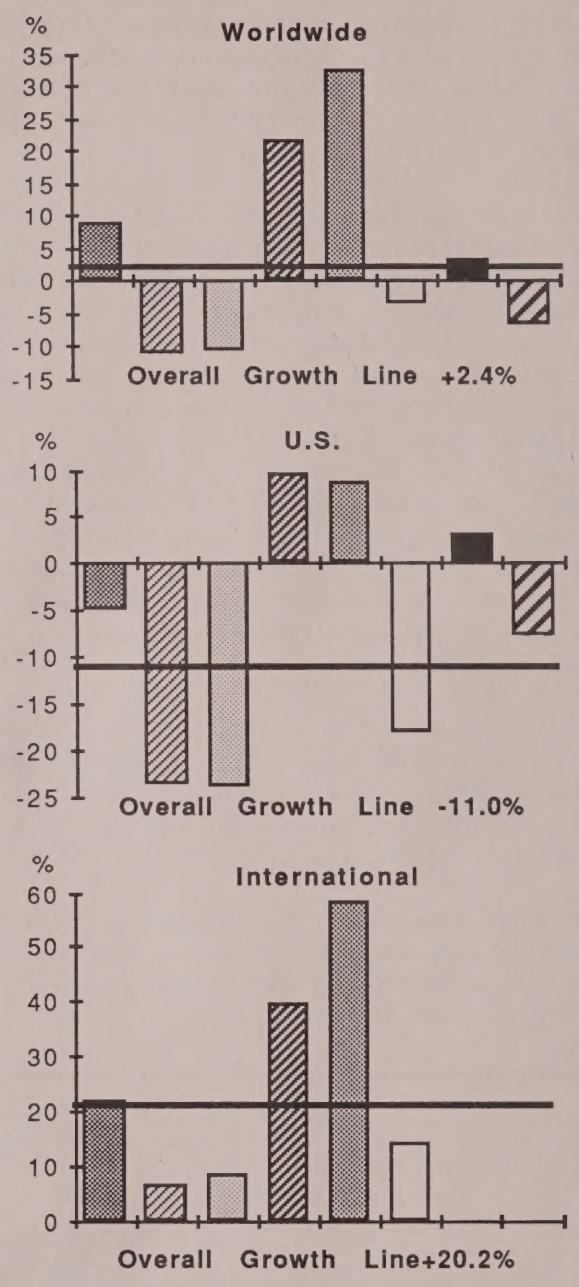
ITEM - Processor revenue grew 9%, but peripherals and office systems/workstations each fell 11%. Worldwide revenue from large-scale processors rose "substantially," but had to accommodate lower returns for other multiuser systems classed by IBM within the processor category. The fall in peripherals was due "primarily" to the weak storage sector as IBM's double-density 3380's and other products met slacker demand and sharper competition, particularly from the PCM vendors. The office systems/workstation decline included a small drop-off in total PC-related hardware. In short, no overall hardware category displayed real strength in 1986. Aping the US economy as a whole, IBM had to rely on "soft" revenue from software and services.

ITEM - The other hinge on which the year swung shut on IBM's hopes was the U.S. market, which slipped to under 50% of total revenue (that is, excluding miscellaneous revenue and the U.S. government contracts categorized by IBM as Federal Systems). The U.S. share fell from 58% in 1984 to 55% in 1985, to 47% in 1986.

What seemed comparatively bright spots in the overall picture tended to dim in the tenebrous U.S. Rather than rising, processor revenue actually fell 5%. Maintenance and program products (software) revenue climbed, but only at comparatively anemic rates of 9.5% and 9% respectively.

GROWTH OF WORLDWIDE IBM BUSINESS SEGMENTS IN 1986
(Source: IBM Annual Report)



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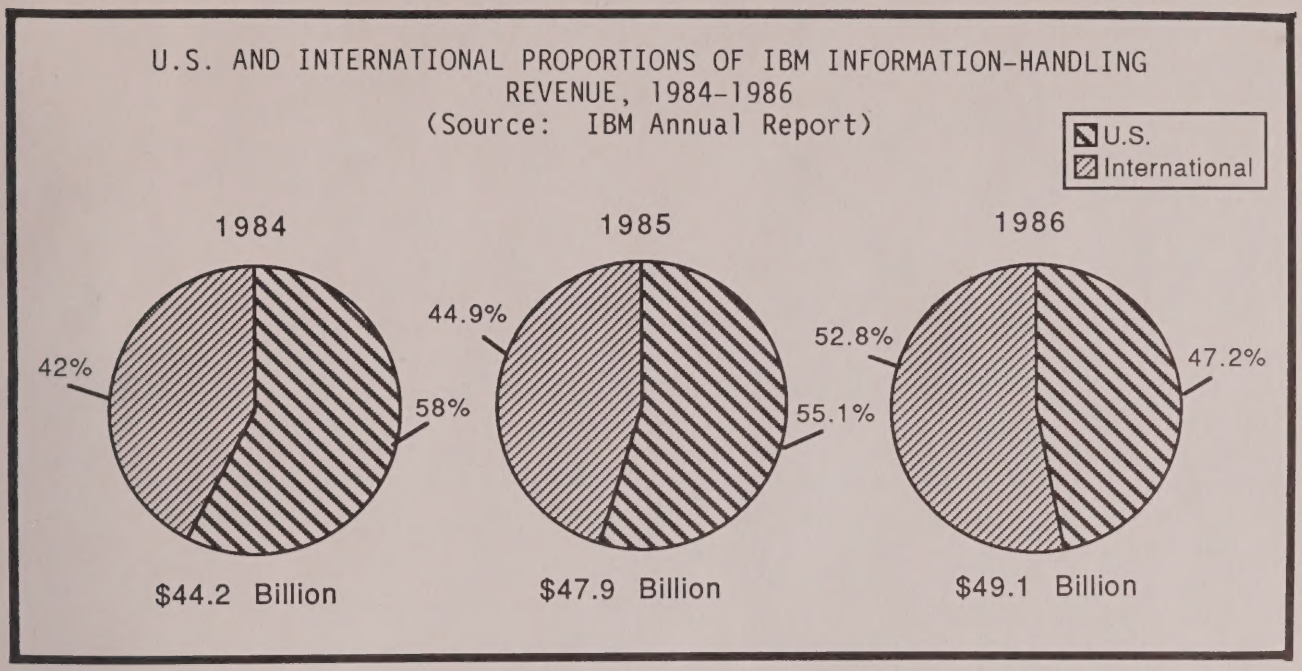

Federal Systems, which had grown 25% in 1985, managed only a 3% expansion in 1986. As a result, total U.S. revenue plummeted 11%.

ITEM - Taking up much of the slack was the international market, where revenue grew 20%. Processors were up 22%, maintenance 40%; the generally weak peripherals and office systems/workstation sectors managed to eke out growth rates of 6% and 8% respectively.

The contribution of the international market was even more marked on the bottom line, especially on the part of Western Europe. In 1986, the Europe/Middle East/Africa sectors (for all intents and purposes, Europe) accounted for exactly a third of worldwide customer revenue but almost half (47%) of IBM's total net income. In the Asia/Pacific region, where IBM is under pricing pressure, revenue grew 30% in 1986, but earnings only 5.4%.

The bad news is that, while the money is real enough to be spent, the growth is illusory. By IBM's own account, currency conversion accounted for $4.365 billion of revenue and $645 million in earnings. If that amount of revenue were subtracted from the international side it would have been flat compared to 1985 rather than up 20%. As a result, worldwide revenue would have fallen 6.3% rather than rising 2.4%. Without currency conversion, IBM's net income would have been down 37%.

As noted earlier, the world economy is so interrelated that, if the currency conversion had not broken so strongly in IBM's favor, it might have signalled better growth in the U.S. Nevertheless, the overall picture for IBM in 1986 remains decline in the U.S. and stagnation internationally.

In assessing the outlook for 1987, one has to look at the exchange rate factor. The fact remains that a 20-40% swing in the value of the dollar has a lot more effect on IBM performance than does the annual swings in actual product sales. But this, of course, is a sword that can cut both ways, and just as exchange rates helped mask many of the real difficulties IBM had in 1986, if the value of the dollar strengthens significantly it could add to the many challenges IBM faces in 1987.

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• IBM EXPLAINS ITS MIDRANGE, TAKE 234. Not too long ago IBM tried to clarify its midrange strategy as based around the 4XXXs, the S/3X lines (to be thought of as one continuum), and the 9370s. Now, however, in announcing new RT PC models that increase performance of the Unix-based system 2-8 times that of the previous high-end RT, IBM welcomed the machine into its midrange family. IBM obviously realized what IDC's own research confirms -- that most RTs are being used as small multiuser systems and not standalone workstations. IBM, though, stressed that it counts the RT as a "special-purpose" system a la the S/1 and S/88. Continuing in its "SolutionPacs" strategy, IBM announced bundled special-purpose software and support packages for 9370/VM, S/3X and IBM PC/DOS environments. DDM/PC apparently allows concurrent use of data files and data management resources on a host. Also included were more minor System/36 enhancements and some Series/1 improvements.

• APOLLO EYES NEW DOMAIN. Apollo calls it the Network Computing System and would very much like to see it become the industry standard in intervendor network computing. NCS is Apollo-developed software that can break applications into modules and automatically distribute them among processors (database servers, compute servers, or whatever) on a network to achieve optimal performance, independent of the network or processor type. Apollo will license the source code and publish the specs in an attempt to establish NCS as a standard. A few weeks after the introduction, Apollo sponsored the first meeting of the Network Computing Forum, a consortium of vendors and research centers that will work to develop NCS applications. Players include Alliant, Apple, Concurrent, Convex, Oracle, 3Com, and other manufacturers, Rockwell, Caterpillar, and others to represent the user community, and MIT's Project Athena, and the University of Michigan from academia. Stay tuned.

• DIGITAL AIMS AT LOW END OF WORKSTATION MARKET. The Digital/Sun/Apollo workstation wars heated up as Digital introduced its MicroVax and VaxStation 2000 models. Starting at around $10,000, the systems run as fast as their standard counterparts for about half the price. Diskless models are available for local-area Vax cluster arrangements. The MicroVax 2000 runs Ultrix or VMS.

• MORE PORTABLE COMPAQ. After taking its machines from luggable to desktop size, Compaq introduced the 18-pound, 80286-based Compaq Portable III. The machine has a new high-resolution plasma display and can be attached to a larger Compaq monitor. Compaq priced the machine from $3,999 and will discontinue the Compaq Plus, Portable 286, and some Portable II models. It stressed that the Portable III uses "industry-standard" 5.25-inch disks.

• COMPUTER NOTES FROM ALL OVER. The (London) Times Literary Supplement is the most important review of intellectually serious books in the English-speaking world (the New York Review of Books comes off like TV Guide next to it). The February 13 issue managed to allot almost two pages (alongside the reviews of books about the feminine ideal in Renaissance literature, Monteverdi's operas, Le Corbusier's architecture, Walter Pater and the modernist paradigm, and the first volume of a short-title catalog of books printed in Britain 1475-1640) to a review of five word-processing programs and a discussion on the merits and demerits of desktop publishing for academic journals. WordPerfect's spelling checker, it turns out, is available in both American and British versions, which the Gray Sheet thinks very honourable of them.

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THE GRAY SHEET
Computer Industry REPORT

D.C.BELLOMY, EDITOR JANUARY 23, 1987 • VOL.22, NO.18 P.J.MCGOVERN, PUBLISHER

WAVERING WANG: NEW PRODUCTS, OLD PROBLEMS

Leo Tolstoy got it wrong -- happy families are not all alike, and every unhappy family is not unhappy in its own way. There are as many flaws in happy families as in unhappy, except that they try to remain oblivious to the blemishes. And there is a narrow range of constants for the shapes that familial unhappiness can take, as the repetitive plotlines on the evening soaps prove.

It's the same with major computer vendors, except that among their number there is the possibility of being at one and the same time a happy family and an unhappy computer company -- the possibility of being named Wang.

After a year and a half during which headlines about executive turnover alternated with those detailing sliding profit levels, the baton has officially passed from Dr. Wang to his son Fred. It is Wang fils, president/treasurer of Wang Laboratories, who now signs the letters announcing "the company's strategy for success" and answers the toughest questions at press conferences and consultants' briefings. So far Fred Wang is justifying his father's faith in him by acquitting himself in these high-pressure, often hostile environments usually better than the other Wang execs on the dais; on the other hand, that could be in part because most of the potential competition had already left.

The company's problems are exacerbated by the difficulty of leveraging new VS general purpose computer sales from a user base for whom Wang still often means dedicated WP on OIS systems. Moreover, Wang has damaged itself with products too long delayed (e.g., the high-end VS 300) or rushed to market too soon before adequate debugging (notably the latest operating system revision). Its reputation for service and support also trails its principal rivals.

The magnitude of the task confronting Fred Wang has been revealed in a series of blows since 1Q 1985, when for the first time in a decade the company experienced a drop in earnings. Laying off 1,600 employees in June 1985 was partly responsible for the $109 million loss for that quarter, but neither the layoffs nor the losses ended there. This past July another 1,600 personnel cuts were requested, presaging a $30 million loss for 3Q1986. Then on January 6 the company announced that it would lay off 1,000 more employees and impose a 6% pay cut on the remainder, and that it anticipated a 4Q loss of at least another $30 million. The loss turned out to be $78.6 million.

Fred Wang has had to explain why the latest bloodshed was necessary despite record orders (too many couldn't be met due to manufacturing problems in October, and due to "poor planning" the plan was for even higher orders for the quarter despite the continuing Great Softness in U.S. sales), and how he plans to turn things around. The ideas seem sound -- but as Fred Wang admits, they usually are from Wang Labs, it's the execution that has created problems.

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The "strategy for success" outlined by Fred Wang has several components. Most remind one of other vendors' plans, even if tailored to Wang's particular situation, but they are not any less necessary for their predictability:

- A new generation of VS systems with performance and upgrade lures.
- Lower overhead (e.g., the layoffs and pay cuts) and more emphasis on sales (cf. a planned 25% increase in sales personnel).
- Decentralization of authority at Wang's Lowell, Mass. headquarters to line operational managers to streamline the decision process and create measurable productivity standards.
- Improved customer relations through a higher degree of field accountability (i.e., more decentralization).
- A focus on seven selected vertical markets.
- Development of five horizontal product areas.
- Beefing up "soft" revenue with software and services, including newly trained "consultants."

Fred Wang avers that successful implementation of this strategy will allow his company to attain a series of ambitious corporate goals: $5 billion in annual revenue by the early 1990s, from a little over half that in CY1986; and, by 1990, 10% aftertax profit; 20% increases in its share of the targeted vertical markets; the highest ranking in customer satisfaction among mini/mainframe companies; and recognition as one of the top three vendors in the industry.

It is an axiom that goals should be aggressive to prod maximum performance; however, it is also the case that if you're just blowing smoke, the smoke gets in your eyes. Some of these objectives would not score high on a reality test.

To take one obvious example, for Wang to become the leader in customer satisfaction is not in itself impossible. Far stranger things have happened, but they usually take time -- certainly longer than the 47 months max that Fred Wang has assigned himself. Customer perceptions notoriously lag behind reality, as Unisys (Burroughs) discovered, so even if Wang deserved the highest rating by 1990, one may doubt whether it would be awarded the accolade.

Just how far Wang has to go to deserve the ranking is suggested by customer reactions to its service program, a critical element in user/vendor relations, as measured last summer in the annual survey conducted by IDC's Customer Service Program. Not only was Wang a considerable distance behind the frontrunner (consistently HP in last year's race), but it invariably fell short of the average rating of twelve of its competitors. In five of eight factors as well as the overall ranking, it had the lowest ratings, sometimes tied with others. It may not have deserved its 1986 reputation, but that's what the only possible judges of customer satisfaction thought.

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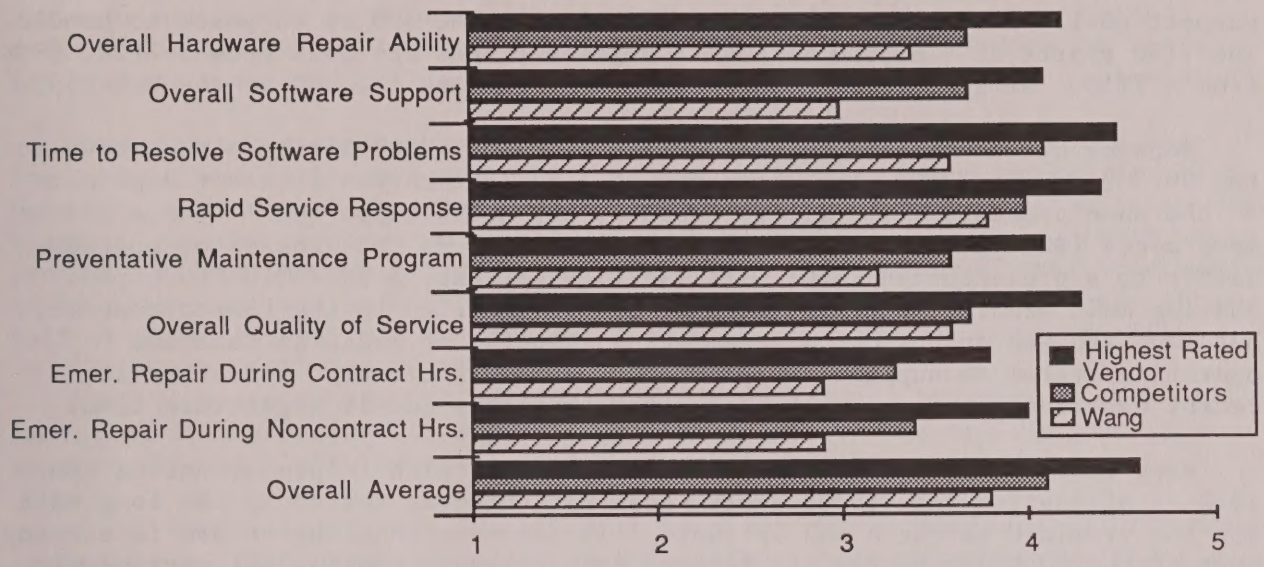
1986 USER RATINGS (1=UNACCEPTABLE, 5=EXCELLENT) OF CRITICAL SERVICE FACTORS FOR WANG VIS-A-VIS ITS COMPETITORS*
(Copyright 1987 -- International Data Corporation)



*An average of Burroughs, CDC, DG, Digital, HP, Honeywell, IBM, NCR, Concurrent, Prime, Sperry, and third-party service firms

And as for being in the Top Three overall, presumably alongside IBM and Digital, the shakeout and reconsolidation among major vendors make it difficult to prophesy who even the players will be in 1990, let alone the winners. However, the Gray Sheet would count Wang's strategy successful if by then it is winning the same share of the pot that it got in 1984, even if it doesn't have more chips than, say, Unisys, Hewlett-Packard, or NCR.

Even to attain this more modest goal, of course, Wang must address current perceptions by customers stung in the past and anxious about the company's future viability. In this context, some of Fred Wang's more utopian goals are understandable and justifiable aspects of his marketing strategy -- justifiable unless once again corporate plans are predicated on unrealistic expectations.

New VS 7000 Systems

One positive sign is the announcement of Wang's VS 7000 series. The company makes no claims for technological innovation with the new line (it is a straightforward extension of the VS 300 processor architecture and system bus downward and a promise of extension upward), but the new products do offer distinct improvements in claimed performance and easy upgrade paths.

Two models, the 7110 and 7120, effectively replace the VS 80/85 and 100. The 7110 is rated at about the same performance as a VS 100, supports 35-70 users, and would compete against the VAX 8300. As an entry point into midlevel VS systems it is, at $90,000 with 4MB of memory (4MB increments up to 16MB go for $6K/MB), about a third more expensive than the 85, but it does offer higher performance and, probably even more importantly, a better upward migration path. A simple board swap produces a 7120, rated at 1.2-1.5 the performance of a VS 100 (which will still be marketed, but not pushed) and capable of supporting 50-100 users. A new 7120 with 4MB will go for $120,000, while a 7110 upgrade costs $40,000. Wang expects to pit it against the VAX 8300 and 8500.

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The real upgradability advantage of the 7100 segment of the new series comes with a board swap from the 7110 or 7120 for the 7150, which uses the same CPU as the VS 300. However, with a third fewer I/O slots, it is designed to support 60-120 users rather than the 80-192 that the 300 is supposed to handle. The 7150 starts at $160,000 with 4MB; upgrade prices are $50K from a 7120, $80K from a 7110. Wang wants to compare both the 7150 and the 300 to the VAX 8500.

Because of the I/O limitations on the 7150, the 7000 Series alternative to the VS 300 is the 7310. It's not so much a replacement as an exact duplicate -- the same processor, I/O slots, cabinet, and users supported -- for a little more money ($232,000 with 8MB). This is justified on the grounds of upgradability to a preannounced 7320, with two tightly coupled 300/7310 CPU boards sharing main memory. Shipment of the 7320 is expected in the fourth quarter, but Wang stopped just short of committing itself. It wants to tune the operating system to support two processors more efficiently, and after its recent experiences, it wants to make sure that it's got it right this time.

Wang realized and has prepared for the biggest risk in preannouncing the 7320 -- alienating the VS 300 users whose patience was tested by the long wait for the promised hardware and software. It stresses that the VS 300 is already part of the 7000 series for all intents and purposes, running all peripherals now available or to be designed in the future for the 7000s, and that VS 300 customers who are so minded will be allowed to upgrade to the 7320 without any additional charge to compensate for the internal adjustments.

The latest data from IDC's Buying Intentions Survey suggest that the new systems make sense from a marketing perspective. The demand for new machines from the Wang installed base is heavily weighted towards the high end, while it has a sagging middle. The VS 7000 announcement gives three systems at the 300 performance level with slightly different I/O (user) capacities, upgrade paths, and prices, while it revivifies the midlevel VS line.

Moreover, the strong demand at VS 300 sites for additional 300s (over the next six months surveyed sites planned to acquire almost half as many as were currently installed) suggests that there will be considerable interest in the 7320s. Wang has promised that in the future it will always have new systems that exceed the demands of its current heavy-duty users.

The fact that it has had to make this promise is a reminder that the desire for 300-level systems and above is not entirely a plus for Wang, since it partially reflects pent-up demand that has been stymied by production and software development screwups in Lowell. VS 300/7320s that go out over the next six months include many that should have shipped in 1986. But at least these forgiving customers' continued interest in Wang bodes well for 1987.

Marketing Options

Then there are the other customers. The most recent IDC Buying Intentions Survey, which was conducted shortly before the January announcements, suggest that around 85% of the Wang VS installed base plan to continue to acquire new or replacement equipment from Wang for the foreseeable future, but the remainder, including an uncomfortable amount of VS 85, 100, and 300 sites, are far more negative or uncertain. This degree of disgruntlement is probably not news to Wang, considering the emphasis that Fred Wang has been putting of late on listening better to users' needs.

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The other big question about marketing into the Wang installed base is its schizzy nature -- part OIS word processing, part VS general purpose computing. Only 20% of VS customers sampled in the latest IDC Buying Intentions Survey had ever had an OIS word processing system, which testifies to the sales force's success in penetrating new sites but is less complimentary on how well the company's marketing strategy over the past few years has been implemented.

Wang had hoped to leverage the OIS base into VS systems, but found that the typical word processing site already had another vendor's minis installed. Moreover, even when Wang sales people were able to place a VS system in an OIS bastion, the users proved surprisingly recalcitrant about shifting their word processing from the dedicated system. Some 70% of the Buying Intentions sample of VS sites that had an OIS system at some point still use it, and fewer than half of these current OIS users plan to move their word processing to VS.

Wang is learning what to do with broken eggs. In an attempt to make an omelette, it has decided to abandon its marketing strategy and instead to support OIS again with promises of future enhancements to the line.

Under the circumstances, Wang has to go after new VS business all the more aggressively. One way it hopes to do this (along with everyone else and his brother) is to concentrate on specific markets. What Wang hopes will be its Magnificent Seven verticals are financial services; the feds; state and local government; manufacturing; legal; professional services; and hospitality.

Wang cites as an example of the benefits of specializing the sales force its recent success in the legal market. A couple of years ago it was nowhere; then someone got hired who knew the market, and now the company is in 80% of the top 200 firms. It would have to repeat that rags-to-riches story in three of its targeted markets, since state and local government, professional services, and hospitality are essentially untapped areas for Wang.

Besides the vertical perspective, Wang wants to be known as a vendor specializing in five horizontal markets: departmental/end user, record management, electronic publishing, technical workstations, and integrated voice/graphics/data. The first two play off Wang's past, while the others break new ground -- but only for Wang, since every major vendor is plowing money into e-publishing, and there's already a large crop of technical workstations.

And there's the rub: vertically and horizontally, Wang sounds very much like just about every other vendor around. Whether or not all happy companies are alike, all unhappy computer companies seem alike in their plans to get happy again. Who doesn't expect great things from the financial services market, government sales, and electronic publishing? Wang seems aware of the problem, and falls back on a past strength (its reputation for user friendliness) and a possible future strength (the VS architecture is allegedly uniquely suited for three-way integration of voice, graphics, and data) to differentiate itself from others. In tribute to the criticality of software, Release 2.0 of Wang's PACE programming/DBMS tool was timed to coincide with the new hardware.

Doubting Thomases scoffing at Wang's prospects are reminded that the company's been counted out before. The competition, though, is tougher and the market more mature than when Dr. Wang could identify a particular need and niche and rebuild a faltering company around word processing. Fred Wang's mission from his father is daunting: he has to make lightning strike thrice.

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BEHIND THE X WINDOW OPENING: NO NeWS IS GOOD NEWS FOR SOME

Preening themselves on their contribution to an historic occasion, representatives from nine major technical workstation manufacturers gathered at a hotel in Cambridge, Mass. on January 15. The occasion was a joint announcement of support for the X Window System developed a few meters away at MIT as a graphical windowing standard. In the same alphabetical order they used for their prepared remarks, the nine were Apollo, Dana, Data General, Digital, Hewlett-Packard, MASSCOMP, Siemens, Sony, and Stellar (Bill Poduska's latest project).

As Apollo's David Nelson framed the issue, "industry support of X Window can result in the same leap in software portability that the industry has seen with the adoption of Unix." Underscoring this concern was the decision to allow Applix, the Unix software vendor, to speak even before the hardware vendors said their piece. The key is that X Window is device-independent, allowing application developers to incorporate windowing for text and graphics that can run across a network of different vendors' systems and workstations.

X Window, like the rival Andrew window system developed at Carnegie-Mellon, is the product of university-industry cooperation. It was created under the auspices of Project Athena, an MIT program investigating the potential for networked workstations in the curriculum that is funded principally by Digital and IBM. Drawn in part from previous work by two Stanford professors, X Window was initiated in the spring of 1984 by a member of MIT's Laboratory for Computer Science and an Athena staffer on loan from Digital. The first public release followed in September 1985.

Like everything else emanating from Project Athena, X Window is owned entirely by MIT, but the university is striving to incorporate improvements suggested from all sides. Modifications to date, for example, have responded to the qualms of some about X's potential in high-performance graphics.

The current release, Version 10.4, includes three toolkits developed by HP, the Berkeley Unix folks (who now provide X to new licensees), and the Project Athena staff. Because the release scheduled for this spring, Version 11.0, will blend all three into a single toolkit, it is expected to serve as the foundation for future versions. Proposals are already under consideration for 3-D graphics library extensions (Stellar has drafted one possible approach), the integration of video, and blending X Windows with PHIGS.

Because of its portability, some of the vendors involved view X Window as applicable to more than their Unix workstations. Digital wants to be able to use it on any desktop VAX and will therefore add it to VMS products. HP indicates that it is actively considering X for its proprietary operating system lines, while DG is at least mulling the question.

Of more than passing interest were the vendors who were not present. IBM supports X for the RT under Release 2 of the 4.2 Unix that is available for universities from its Academic Information Systems business unit, but has not followed suit for AIX, the Unix version that the company prefers to market. The Gray Sheet surmises that IBM has two misgivings about X Window for the RT: its pending support of Microsoft Windows as a PC standard, and its indecision about how to position the RT. To the consternation of IBM product planners, the typical utilization today of the RT is as an inexpensive small-scale system rather than as a single-user workstation.

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Then there's Sun Microsystems, over which the joint support of X Window casts a cloud (no doubt small, but still a change after the clear skies and smooth sailing of the past two years). Last October, Sun attempted to follow up on its success with NFS by sponsoring its own graphical windowing standard. NeWS draws on ideas in X and Andrew, as well as the imaging model pioneered in Adobe Systems' PostScript language, in an attempt to play the de facto standard role to which casting directors at nine vendors in January assigned X Window.

As part of the effort to create a standard, Sun, like IBM, was invited to participate in the Cambridge press conference, but it declined. Also, the press release spoke of X only as a rather than the standard, and most (though not all) of the speakers followed suit. Even so, support of X was obviously seen by at least some of the participants as an alternative to Sun's NeWS.

Part of this was wariness about increasing their dependence on a competitor for industry standards. John Scanlon of DG, for example, noted that "MIT provides a forum for many different user communities to provide input on needs without the sway of proprietary business goals. . . ." Sun may have been misled by its experience with NFS, for which there were no public domain options.

Moreover, many companies preferred working with Sun, a smallish vendor committed to open standards, to waiting on an industry giant like AT&T to increase Unix's networking capabilities. But Sun, if not yet a red giant within the constellation of computer vendors, is no longer a white dwarf; total revenue in 1986 came to $340 million compared to Apollo's $390 million.

Finally, a reaction seems to be developing to what some apparently feel is Sun's hubris. For instance, resentment simmered in the Apollo booth at this month's Uniforum over what struck Apollonian ears as the gloating tone in Sun's press release announcing that Apollo has finally decided to support NFS.

Of more direct relevance to the windowing standard issue, it was worthy of note that Adobe chose to be the other software company besides Applix to make a presentation at the X Window press conference. A company representative intimated that, although Sun makes a big deal of its PostScript implementation in NeWS, its PostScript is not exactly the version that Adobe markets for laser printers. Consequently there could be some WYSIWYG problems.

If there is a degree of comeuppance for Sun in the nine's haste to endorse X Window, it need not follow that pride goeth before a fall. Although Sun didn't expect to lose money by selling licenses to NeWS, it was hardly depending on license fees to maintain revenue growth. At worst, its reputation as the font of workstation standards has suffered a setback.

Moreover, the jury is still out on whether NeWS or X becomes the dominant graphical standard for workstations. It's not enough to promulgate a standard -- someone has to maintain it and make the hard decisions about what extensions are allowed and what aren't. The problem becomes acute for a very basic standard like X Window, which many vendors will be tempted to create their own versions of. MIT's ability to negotiate these shoals is still to be tested.

Right now, it seems that a de facto standard without X's nine is hard to imagine. But the only thing certain is that someone's plans will become the industry standard, and that someone else's will become what Thomas Gray called "Rich windows that exclude the light,/ And passages that lead to nothing."

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• DIGITAL'S YEAR. Jumping ahead of IBM even in its announcement of financial results, Digital surprised Wall Street with yet another sterling quarter. With 22% growth in revenue and a near doubling of net income, Digital's 4Q results (2Q for its fiscal year) brought overall 1986 revenue growth to 19.7%, product sales (i.e., hardware) growth to 16%, and net income growth to 110.1%. As a result, Digital stock has passed IBM's a second time -- the stock split in May erased last winter's record, but IBM has been steadily slipping since June while the value of Digital's shares has been marching in doubletime.

• BUT NOT LESS THAN A MAINFRAME. For some time Digital has been touting VAXClusters as "more than a mainframe," but it turns out they were just mainframes all along. Digital is now selling preconfigured VAXClusters to compete against IBM large-scale systems. The VAX 8974 is four clustered 8700s; the 8978 is eight, rated at 50 780-equivalents (cf. a 3090-400). Nevertheless, except for software pricing they are no different from what users could have gotten all along: high-octane distributed processing that doesn't yet permit the single-image processing that most users associate with mainframes.

• NEW FROM NAS. The expected expansion of the channel rate on AS/XL systems to 6MB/sec has become official, while NAS also announced a new system filling a performance gap (the AS/XL 70, available later in the quarter, will be a dyadic version of the detuned uniprocessor AS/XL 50) and a statement of direction on expanded memory (it will be supported on all AS/XL processors and, unlike expanded memory from IBM, will be reconfigurable).

• AND AMDAHL TOO. Amdahl's pre-IBM mainframe announcement involved a new uniprocessor version of the 5890 line, the fully tuned version that can be field upgraded to the 5890-300 dual or 5890-600 quadratic processor.

• HP SPECTRUM PRICE CUT. The 9000 Model 840's price has been cut 28% two months into the product's life cycle, but HP denies rumors of further delays on commercial Precision Architecture systems.

• ALLIANT CHANGES STRIPES. Alliant reports that enhancements to its parallel processing systems, notably disk striping in the operating system to parallelize file access, improve performance 30-55%, depending on application.

• FAULT-TOLERANT RETAILING FROM NCR. The 7000CP system is designed by NCR to meet requirements by mass merchandisers, department stores, food stores, and other retail merchants for continuous OLTP. Dual-processor versions offer mirroring of processors, memory, disks, power supply, and software.

• IBM PC PRICE CUTS. As "the result of a normal business review" (read: to become less uncompetitive against compatibles and clones and to prepare the way for new models), IBM has cut the single-unit price of the XT 286 15%, the single-floppy AT-68 15%, and the 20MB hard disk XT-89 8%.

• DEPT. OF AMPLIFICATION AND EXPLICATION. In the December 16 issue (Vol. 22, No. 16), the chart labeled "Proportion of Markets for Multiuser Systems Served by Vendors from Their Own and Competing Markets" on p. 6 omitted the labels specifying that the left-hand figure represented the U.S. market, the middle one the European market, and the right-hand figure the Japanese market.

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THE GRAY SHEET
Computer Industry
REPORT

D.C.BELLOMY, EDITOR December 22, 1986 • VOL.22, NO.17 P.J.MCGOVERN, PUBLISHER

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IBM STASIS, YEAR TWO OF THE GREAT SOFTNESS, AND DIGITAL'S SUCCESS THE LEAD STORIES OF THAT WAS THE YEAR THAT WASN'T

In crucial respects, the most important news of 1986 was what wasn't news -- the events that people had some reason to expect, but that obstinately refused to occur. It was a year in which IBM did not figure out how to stimulate mainframe sales, did not ship replies to Digital's midrange success and to criticism of the performance and interconnectivity of its S/3X lines, and did not announce a PC product responding to the surge of clone/compatible sales.

It was another year that wasn't "The Year of the LAN," that didn't see an efflorescence of optical storage, that wasn't the year everything came together for MAP/TOP, that didn't witness Apple paying the price for noncompatibility and weak communications products, or Microsoft announcing a new MS-DOS, or a major move by AT&T except for what might be the first flutter of a white flag.

And it wasn't the year when an industrywide rebound could begin to ease the layoffs, lower profitability, and high angst levels of the Great Softness.

On the other hand, these voids often became the top stories of 1986, or helped establish their contours and significance, while other events (many with more positive implications) were staking their claim to share the title. Once again, the Gray Sheet polled its associate editors and the analysts at IDC to determine the year's major stories, and then exercised editorial judgment to establish an official Top Ten list. The results read, in descending order:

- Problems at virtually every level of IBM's line of computer systems
- The Great Softness, Year Two
- Digital's strategies hit pay dirt
- Unisys to the power of two
- Software vendors reconfigure, expand out of niches
- IBM PC-compatible unit sales surpass the original
- Success of the DB2/SQL standard
- Engineering workstation market heats up
- New uncertainty about AT&T and AT&T's version of Unix
- Electronic publishing a fad with real potential (for once)

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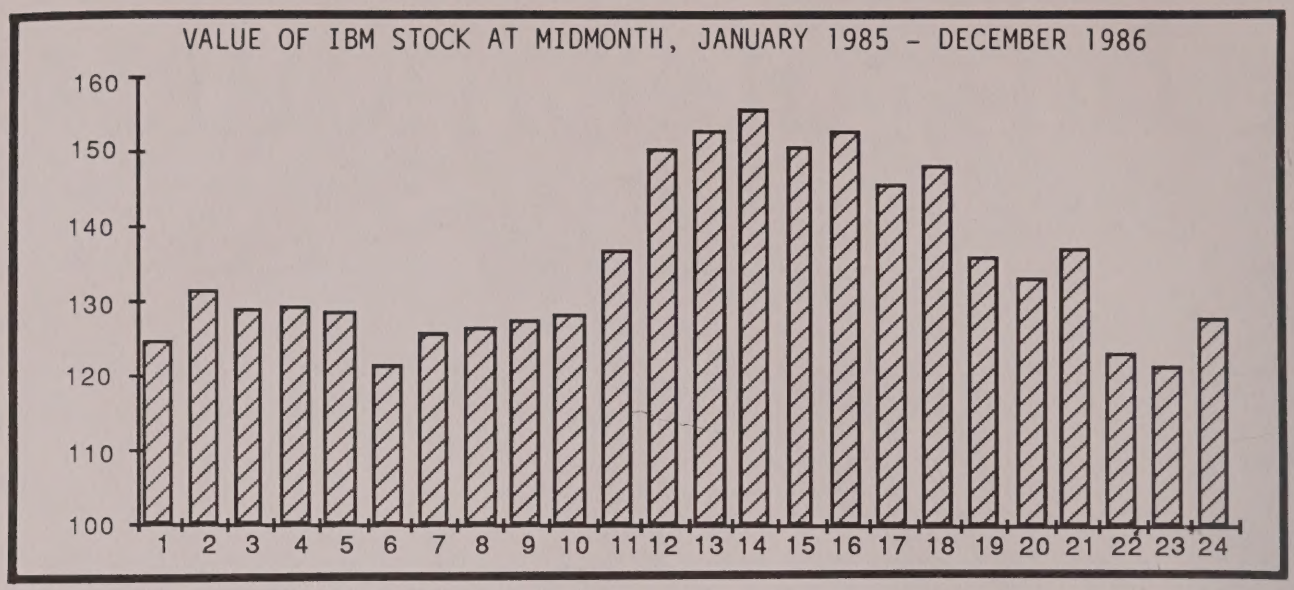

1. Problems at virtually every level of IBM's line of computer systems

Color 1986 blue, not Blue. The Sierra generation, as several Gray Sheet stories have noted (especially Vol. 22, Nos. 6 and 12, July 23 and October 31, 1986), is meeting more user resistance than any IBM mainframes in years. Shipments of 3090-400s seem fairly strong, but 200s have flattened, and the 150 and 180 uniprocessors announced this past February are still nonstarters. In departmental computing, users who moaned about S/36 performance and still bought massive numbers (the 100,000th was shipped in May) have shown a greater willingness to seek other solutions or just sit tight. And in PCs, an 80286-based XT and a faster AT couldn't be expected to keep IBM's market share up.

There were some silver linings amongst the gray clouds. Software revenue from the installed base is still a major plus (see #7 below), double-density 3380 sales have accelerated after a slow start, and a replacement generation of 4381s offering stronger price/performance has been shipping since spring. However, the winners are not adequately compensating for the losers on the bottom line, and there are too many soft spots in the crucial processor lines generating both immediate and long-term revenue. Even the new 4381s involve a trade-off, since at the high end they could be leaching 3090-150/180 sales.

Signs have been accumulating that IBM planners have about given up on 1986 and are laying the groundwork for a resurgence next year. There are reports that, in closely contended bid situations, IBM sales reps are not pushing for 3090 sales to boost 4Q results, but are advising users to wait for the Sierra enhancements expected early in 1987. For the midrange, the big news for the second half of next year will be volume shipments of the 9370s, which offer price/performance in a S/370 environment that will make it more difficult for supermini vendors to poach on IBM's installed base. The 9370s could also create problems for IBM's own S/3X line, but at least users next year will have the option of a new top-of-the-line S/36 that allegedly doubles OA performance and communicates peer-to-peer with S/38s. And an 80386-based PC could be crafted to appeal strongly to IBM's corporate users.

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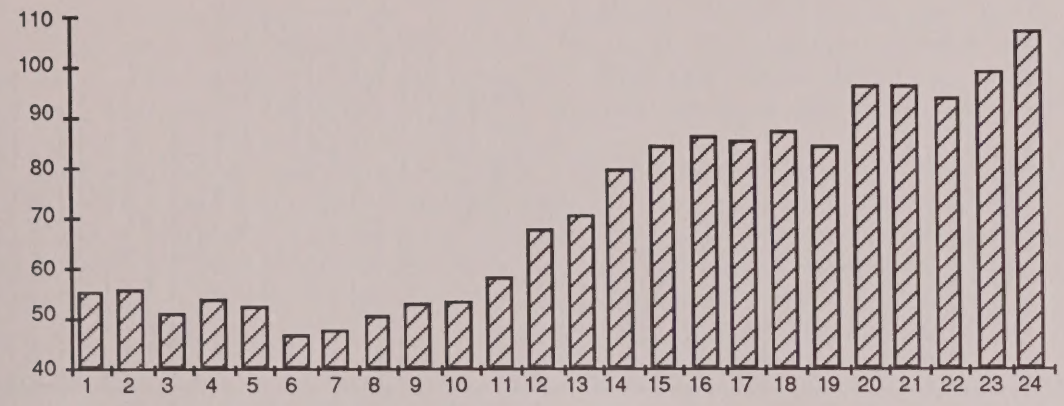
VALUE OF DIGITAL STOCK AT MIDMONTH, JANUARY 1985 - DECEMBER 1986
(ADJUSTED FOR MAY 1986 2-FOR-1 STOCK SPLIT)



VALUE OF SELECTED COMPUTER STOCKS AT MIDMONTH, JAN.-DEC. 1986

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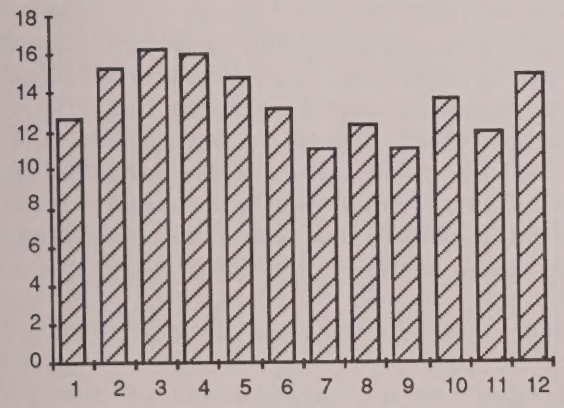

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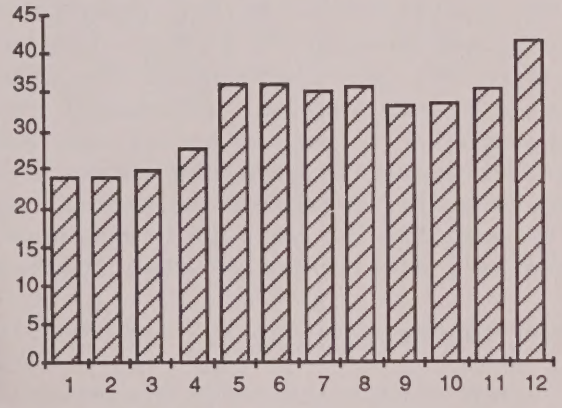

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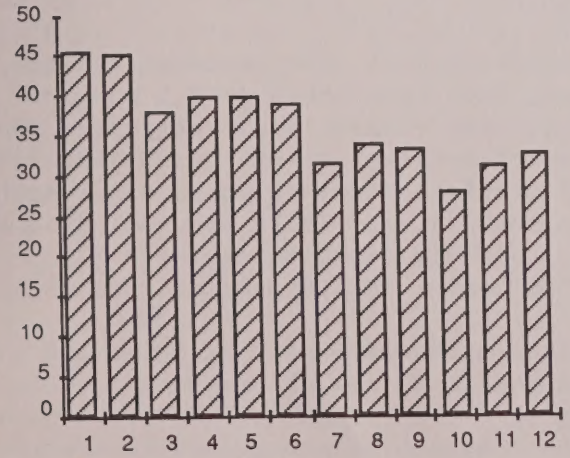
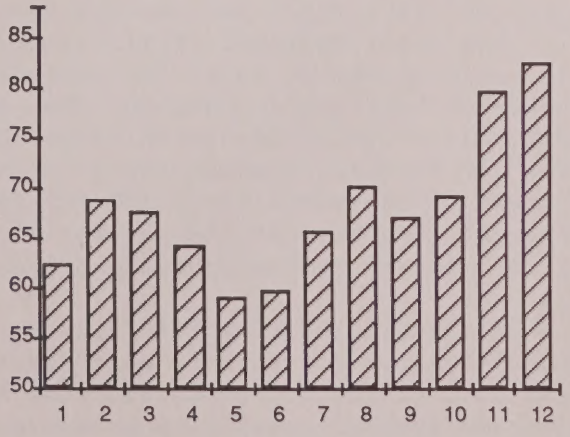


UNISYS (BURROUGHS)



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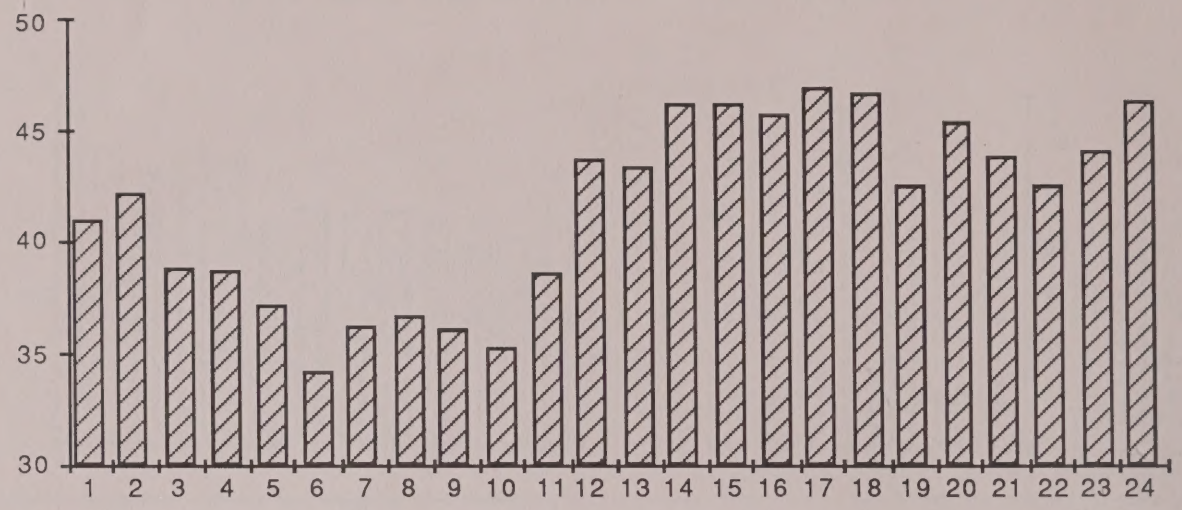
VALUE OF AN AVERAGE OF 18 COMPUTER STOCKS* AT MIDMONTH, JAN. 1985 - DEC. 1986



*Altos, Apollo, Apple, Compaq, Control Data, Convergent, Data General, Digital (adjusted for 1986 stock split), Hewlett-Packard, Honeywell, IBM, NCR, Prime, Stratus, Tandem, Texas Instruments, Unisys (Burroughs), and Wang

But that's tomorrow. IBM's inability to find answers to its problems in 1986 qualifies as the top story of the year because it still bestrides the information industry like a colossus. In particular, Big Blue's blues are the context in which so many of the other top stories of the year occurred. Without a perception that IBM wasn't delivering, Digital wouldn't have had the opportunity to expand so aggressively. Without weak IBM mainframe sales and slower growth for business PCs running on the IBM-compatible standard, there would be far less turmoil among the independent software vendors. And without IBM weighing the average down and hurting the potential of ancillary vendors, the second year of the Great Softness would have been less traumatic.

2. The Great Softness, Year Two

Not only was there no general recovery from the Great Softness of 1985, but the growth rate in the shipment value for U.S.-based computer manufacturers in 1986 will, unless fourth quarter results significantly change the equation, be below last year's figure -- a little over 7%, compared to 9% in 1985 (see the Gray Sheet, Vol. 22, No. 13-14, November 14, 1986).

The Great Softness still bears a "Made in America" label everywhere except in semiconductors, where the Japanese giants have seen their profit margins buffeted by slower growth for cheaper chips. IDC currently projects that the U.S. market will have grown 6% in the value of computer shipments in 1986 (1% for large-scale systems), while U.S.-based manufacturers will have experienced growth in the vicinity of 10% for international sales. There are indications, though, that next year's growth will be more evenly distributed, with U.S. growth somewhat more robust and international sales less expansive.

The outlook through 1990 is for overall growth not exceeding 10% p.a., with some segments and vendors doing better and some (the law of averages is stern and unforgiving) doing worse. Yet the probable protraction of the Great Softness is not necessarily to be deplored, for low-to-moderate growth is the climate for which most industry vendors have been choosing their attire of late.

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A second year of the Great Softness merits a place as one of the very top stories of the year because it has affected the circumstances and expectations of virtually everyone in the industry. It misses the Number One slot it held last year because, as a continuation of 1985 trends, it has not required as much wrenching reacclimatization from the soaring expectations of 1982-84. "Fat" has been cut (unfortunately, often individuals who were competently doing the jobs they were assigned to), consolidations have been effected (both within and between companies), and marketing is better focused and more realistic.

It is therefore not surprising that, for all the volatility in the stock markets in 1986, investors kept the average value of computer companies' shares within a fairly narrow range. They bought stock in vendors who seemed on the right path, and deserted those who didn't. It is to be hoped that this equanimity about the Great Softness continues, and does not dry up the venture capital upon which future innovation, and therefore future growth, so much depend.

3. Digital's strategies hit pay dirt

Consider Data General. On December 9 it unveiled three models of a new Eclipse MV/15000 line of midlevel systems to compete against Digital's VAX 8300, 8500, and 8550. Chart followed chart on the overhead projector demonstrating what DG claimed was its clear superiority in price/performance (e.g., up to 50% faster in single precision whetstones and 35-62% faster in double precision, but 37% less expensive). The new systems, one speaker boasted, capped four years of winning price/performance contests with Digital and IBM. Yet DG's market share has been steadily slipping through those four years, as users have been gradually turning to IBM and, increasingly, to Digital.

Consider Digital -- after all, everyone else is, with its revenue and income soaring, its crescendoing stock value counterbalancing the slippage from IBM and others, and Ken Olsen winning the Gruff, Rumpled, but Oddly Glamorous Industrialist of the Year Award from perennial champion Lee Iacocca.

Digital's success in 1986 has been due to several factors. First, it has been at an optimal point of two product cycles, with MicroVAX II and the new 8XXX systems both shipping in volume. And second, after deciding that long-term growth required that it had to contest the corporate market with IBM, Digital correctly read what would be the most pressing priorities of many users. Price/performance would no longer be so important -- it couldn't get too far out of line with what technology now allowed, but the bargain hunters could be left to DG, Prime, et al. What mattered was what users could do with their systems: running applications, and communicating the results.

So, "Digital has it now," a most ingenious advertising tag. The slogan is not as inappropriate as selling IBM products with the Little Tramp, but it adroitly taps users' mounting frustration without specifying just what "it" is. Usually, though, "it" connotes software compatibility over a wide performance range (something DG and others also have) and a solution to networking (Digital is arguably ahead of most others, but it's not something anyone has "now").

But corporate America was yearning for an alternative to IBM's semi-solutions. As a result, Digital has become the first major alternative to IBM in corporate accounts in years, probably since Honeywell in the early 1960s. The story would be bigger if Digital's hold were more secure (what happens when the 9370s arrive?), but no story of 1986 has been more exciting or more fun.

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4. Unisys to the power of two

The merger of Burroughs and Sperry was significant both in its own right and as a symbol of a new era of consolidation among hardware vendors. Mike Blumenthal's coup required a promise to maintain the separate product lines of the two parent companies indefinitely, but even without the synergy of a combined family of systems, Unisys is shaping up as a stronger contender than either Burroughs or Sperry could have been on its own.

For at least the next half decade or so, this will be relevant mostly to the Unisys user base, since "strong contender" in the case of Bunch players generally means a firm defensive posture, one that can prevent other vendors (especially the cerulean-hued one) from stealing away customers, rather than an aggressive offense against IBM. Both Burroughs and Sperry have been trolling for new customers with OEMed small-scale systems of limited connectivity with their mainframe systems; Burroughs has had more success with its line developed by Convergent than Sperry has had with its Unix-based strategy, but it remains to be seen whether Unisys can migrate either group to its big breadwinners.

Nevertheless, since protective power is the name of the game for vendors of its stripe, the example of Unisys has already found one emulator in Honeywell, which has negotiated a new "entity" with Bull and NEC. And the ingestion of Sperry has made many other vendors nervous, as the proliferation of "poison pills" and other anti-takeover strategems indicates.

5. Software vendors reconfigure, expand out of niches

The consolidation among hardware vendors has trailed in intensity and timing the comparable movement in the software arena, partly because the capital requirements for acquiring computer manufacturers are much more onerous, but also because the dynamics of the software market tilt towards mergers and buyouts. A software vendor typically reaches a ceiling within the niches of its initial success and must add others to remain competitive. The easiest way is to buy another company's strengths, or get bought by someone else. This trend has been accelerating over the past two years because the Great Softness has lowered the ceilings for mainframe and PC software.

The Gray Sheet recently looked at the mainframe software acquisition fever (Vol. 22, No. 13-14, November 14, 1986), but this is only one aspect of the niche-expanding story. IBM-oriented vendors like Cullinet, Cincom, and Software AG are moving into the VAX market; VAX players like Oracle and Relational Technology are moving into mainframes, Unix, and PCs; and PC vendors like Ashton-Tate and Microrim are moving up into the LAN market. PC software vendors, led by Lotus and Ashton Tate, are in general expanding from their retail base into the corporate sell, which requires service to mainframes and minis.

6. IBM PC-compatible unit sales surpass the original

For the first time, PCMs have outsold IBM, at least by weight if not by dollar value, in a major processor category -- and there doesn't seem much that IBM can do about it. It isn't even clear how much it would want to do. It seems likely that the proprietary hooks that IBM could add would only apply to an 80386-based PC, and therefore could affect only those compatible vendors like Compaq who competed at that level; as prices fall for basic 8088 and now 80286 machines, IBM may feel content letting others maintain the DOS standard.

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7. Success of the DB2/SQL Standard

In February IBM repositioned its two relational database programs as the primary products for most DBMS users. Enhancements to DB2 purportedly allowed it to support not just reports and queries, but all applications, even transaction processing, for most largish users who do not yet require IBM Fastpath or TPF; SQL/DS with high-availability enhancements would fill in the gap beneath. And it then pulled out the stops to establish DB2 as the DBMS of choice for the IBM base, even installing it rent-free for six months.

The strategy is apparently working. As other vendors' sales stalled, they have flocked to announce support for SQL and, increasingly, DB2 standards. It is not yet clear just what support will mean in real terms (SQL for mainframes is still "calls only" and has become a moving target, with possible discrepancies between the published standard and IBM activity, while independent vendors have yet to demonstrate what they mean by future DB2 support). What is clear is that users are accepting DB2 as the standard for their mainframe DBMS.

8. Engineering workstation market heats up

At the beginning of the year, this seemed likely to prove an even bigger story, with major products announced by the industry's two giants, IBM and Digital, as their entries to the field. However, IBM's RT has been pretty much a nonstarter, while the success of Digital's VAXStation GPX has not been spectacular. However, there have been major successes by other vendors, including Hewlett-Packard and, above all, Sun, while Apollo started to recover some of its lost market share in the second half of 1986. And the market still grows, with all the players positioning themselves to continue the competition next year. One index of the transition in the market is a change in name: increasingly the reference is to technical, not engineering, workstations.

9. New uncertainty about AT&T and AT&T's version of Unix

The Unix market has been turning a corner towards real acceptance, while AT&T finally unveiled Release 3.0 of Unix V in June. Nevertheless, it had become clear by yearend that the big story about Unix in 1986 involved a new level of uncertainty. Partly this was because AT&T seemed to be retreating from its earlier intention to become a major systems competitor as it combined communications and computer marketing and turned to Olivetti to make sense of its PC line. If computers were becoming less central to AT&T's long-term strategy, where would happen to its commitment to the standardization of Unix? But just as important as doubts about AT&T's future role are suspicions about its current motivations. The networking capacities built into 3.0 by AT&T and the license contracts it is requiring for the new release have raised the resentment level among a number of significant vendors, who increasingly are placing their bets on government-sponsored IEEE Unix rather than V.3.

10. Electronic publishing a fad with real potential (for once)

At least potential for a while. With much of Apple's growth in 1986 directly attributable to the functionality of its Laserwriter printer and with all the other major vendors -- IBM, Xerox, HP, et al. -- hastening to sign up, it's already a bigger market force than past fads like optical storage or bubble memory. It's questionable just how many people really need desktop printing, but it should take a couple of years before the market is saturated.

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Meanwhile. . .

The tradition of selecting Top Tens is a useful regimen, but it inevitably shortchanges stories of real significance. Among the very close runners-up would be the armistice in the Japanese-American chip war, immediately followed by an era of cold war; Apple's recovery; and Hewlett-Packard's Spectrum series, both its announcement and the subsequent delay in the delivery of the first Precision Architecture system for commercial processing.

The advent of 80386-based PCs and servers was excluded at the last minute, on the grounds that their significance can only be evaluated after they become one of the top stories of 1987. Similarly, the divorce proceedings between Ross Perot and General Motors was left out because, in terms of 1986, the story was simply soap opera. If it is to be judged as more than that, it will be over the next year or two as EDS faces new challenges at GM and in the increasingly competitive services segment of the industry.

On the other hand, there have been important, often ongoing developments in 1986 that are difficult to encapsulate as stories, but are often of equivalent (or higher) significance. To the shift from entrepreneurial to managerial control and the acceleration of industry consolidation, both noted in last year's Top Ten issue (Vol. 21, No. 17, December 20, 1985), should be added:

- The increasing attention paid by major vendors to vertical markets, not only to build up volume through VARs but to rev up direct sales.
- The advent of widespread peer-to-peer communications with the spread of the LU 6.2 standard, including IBM's new APPN.
- The ever-widening importance of Asian manufacturing, now of PCs.
- The gradual, still tentative Japanese penetration of the U.S. market, whether through acquisitions/mergers (Fujitsu/Fairchild Semiconductor, NEC/Honeywell) or through manufacturing in the States.

. . . Tomorrow and Tomorrow

And finally, a look at some of the candidates for the top stories of 1987. Last year the Gray Sheet had a pretty good record, like predicting that "a major merger will occur in the Bunch," but you can check back for yourself.

- Higher U.S. growth and lower international will mean that the overall market will grow about 9%, roughly the same as in 1985.
- IBM product cycles will generate a strong second half of 1987.
- Digital growth will begin to level off after midyear as incursions into the IBM corporate base start to prove less effective.
- The AT&T/Fujitsu/Amdahl alliance will be strengthened.
- An 80386-based IBM PC will not squelch the clones but will establish new standards to be copied (e.g., 32-bit bus and graphics).
- There will be more hardware mergers, perhaps in the supermini arena.

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THE GRAY SHEET

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D.C.BELLOMY, EDITOR December 16, 1986 • VOL.22, NO.16 P.J.MCGOVERN, PUBLISHER

THE WORLD THEIR OYSTER: INTERNATIONAL VENDORS, INTERNATIONAL MARKETS

It was apparently Aristippus, a contemporary of Plato, who first opined that "a wise man's country is the world," but the cosmopolitan philosopher was only articulating what ancient Greek merchants already knew: internationalism paid better than parochial nationalism. It still does, especially when a vibrant industry begins to mature on home shores but is still in demand -- lower demand in absolute terms, but higher in growth potential -- abroad.

With the computer industry finishing a second year of the Great Softness in U.S. shipment growth, international sales have assumed critical importance for many vendors. Only a few U.S.-based companies have had significantly higher international than U.S. sales; these are typically vendors who have experienced severe problems at home of one sort or another that have not impinged on users' consciousness abroad (e.g., Commodore and MAI Basic Four). However, other vendors have seen the same tendencies (steady or rising international growth compared to slack or even negative U.S. expansion) in many product categories. In 1985, for example, IBM's gross revenue from foreign customers before interarea transfers rose to three-quarters of the U.S. gross, up from a little over two-thirds of the total from U.S. customers in 1984.

Nevertheless, too much can be read into the differential between domestic and international revenue for U.S.-based vendors. In particular, the foreign revenue growth is in part a function of currency appreciation against the dollar in several of the industry's key markets. This trend partially affected 1985 growth, but the decisive weakening of the dollar against the Deutschmark, yen, franc, and lira did not commence until the fourth quarter of last year (perhaps not coincidentally, a bonanza period for many industry vendors).

The trend has continued through 1986, with only the British pound and Canadian dollar relatively stable among the currencies of America's major high tech trade partners. On December 1, the yen was 22.4% stronger against the U.S. dollar than on January 1; the Deutschmark was 23.4% higher, the lira 21.5%, and the franc 15.8%. Of course, only goods sold on December 1 would reflect that degree of change when converted to dollars, but if the exchange rates on the first of each month in 1986 are averaged, the mean yen would bring 17.5% more against the dollar than it did at the end of 1985, and the ECU (a "basket" of Common Market currencies) 9.4% more. This in a year when IDC now projects the growth in international revenue for U.S.-based vendors at a little under 10%.

This is not to argue that there has been little or no "real" growth in the international market. There are simply too many variables. Some U.S. vendors have benefited from higher exports to the affected countries. Some units or subsidiaries (like IBM Japan) have been relatively immune to currency changes because they try to function as integral parts of the local economy.

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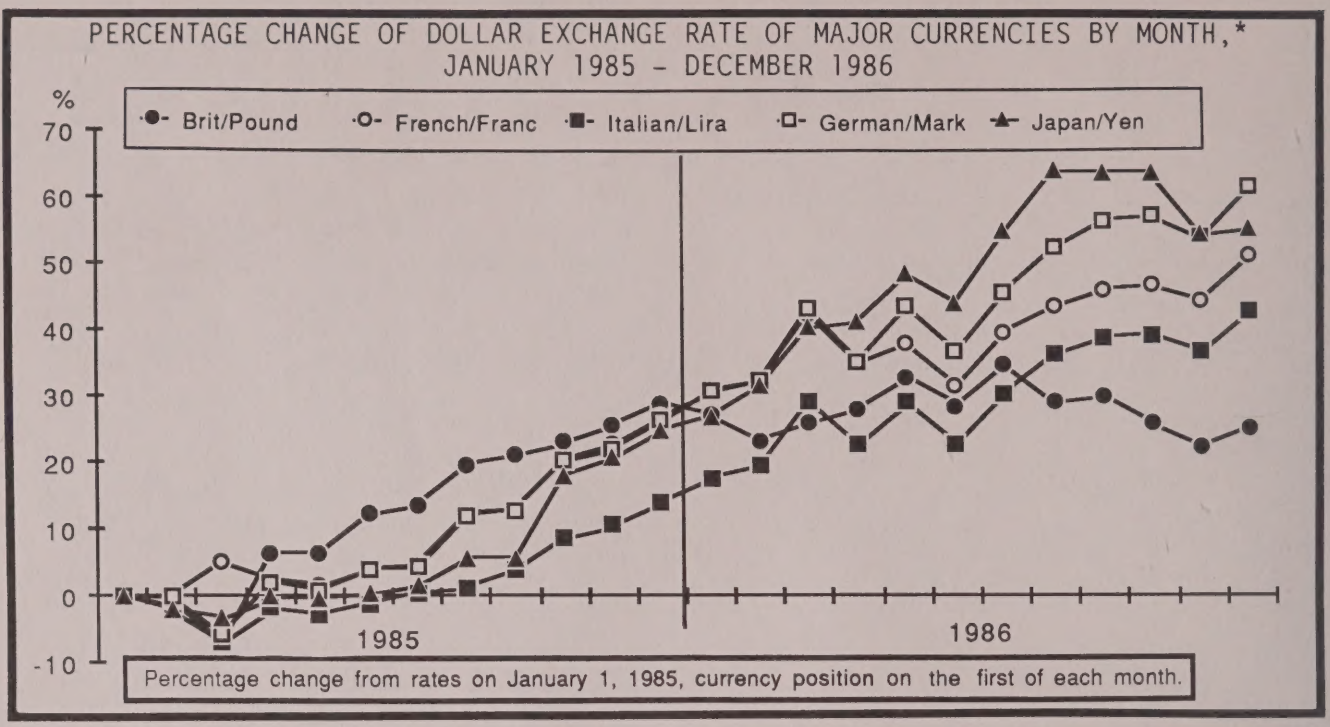

Moreover, dollars are dollars, no matter how accumulated (no one is going to return revenue achieved through currency rates, or even mention it very vocally, even though there were plenty of footnotes a while back expostulating on what revenue and income would have looked like but for the strong dollar). And there is real opportunity out there for both U.S.-based and indigenous vendors to help develop markets that still lag behind the U.S.

Still, the "unearned increment" from currency is a reminder that the market abroad is no cornucopia with fruits sitting there waiting to be pocketed. It is in fact unlikely that international growth will continue to consistently outperform the U.S. Not only is currency exchange a sword that can cut both ways, but there is a tendency for leading foreign markets to trail U.S. trends by a year or two, which would not bode well for future mainframe sales.

And then there is the current ceiling on computer sales. In 1985, 93.5% of the value of computer system shipments outside the Soviet bloc went to markets with under 18% of the population (i.e., Canada, the U.S., Western Europe, Japan, and Australia, with Latin America, Africa, the Mideast, China, and Southeast Asia accounting for the other 6.5%). However, outside the Soviet sphere of influence, those markets also accounted for 80% of the G.N.P., and (probably the most relevant index) all regions with literacy rates above 95%.

Recognizing the importance and difficulty of assessing these crosscurrents, IDC has throughout 1986 been using its network of international offices to create a more comprehensive picture of the worldwide computer market. Traditionally, the Gray Sheet has counted international shipments by U.S. vendors, defined to include U.S. companies distributing foreign-manufactured computers; in the future the Gray Sheet and IDC will add to this America-centric orientation perspectives on critical non-Soviet bloc international markets.

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The initial material is based on non-Soviet bloc markets in 1985, but the 1986 picture will not diverge radically from the trends elucidated here:

- The total world market for computer systems was $80 billion, 28% larger than if measured by shipments from U.S.-based vendors.

- The U.S. market comprised 48% of the total -- 43% for large-scale systems, 49% for medium-scale, 43% for small-scale, and 57% for PCs.

- Between them, the U.S., European, and Japanese markets accounted for 89% of the total, with the rest of the world chalking up 15% of the value of large-scale shipments and 10% of the other three segments.

- For the worldwide multiuser systems market, valued at $58 billion, IBM held 36% of the total, followed by Digital (7%) and Burroughs and Fujitsu (4%). Following at 3% were Hewlett-Packard, Sperry, NEC, and Hitachi. No European vendor accounted for more than 2%.

Growth through 1990 will be attractively but not spectacularly better outside the U.S. than inside. (Caveat lector: because it is hard enough to project growth of the computer industry by processor class and regional market without crystalballing currency gyrations as well, the value of international shipments is here based on the dollar value of comparable systems in the U.S.).

- The world market for computer systems in 1990 should be in the vicinity of $126.2 billion, representing 9% compound annual growth.

- Worldwide growth rates 1985-1990 should be, for large-scale systems, around 7%; medium-scale, 10%; small-scale, 9%; and PCs, 11%.

- Although the U.S. market's growth rate of 8% will trail the rest of the world's 10%, it will still comprise some 46% of the 1990 total.

- Only in large-scale systems will the growth rate outside the U.S. be significantly better than within: 10% vs. 4%. On the other hand, only in small-scale systems will U.S. market growth be higher than elsewhere (10% vs. 8.5%). In medium-scale systems, 10% U.S. growth will trail the rest of the world's 11%; in PCs, 10% U.S. growth will lag behind the rest of the non-Soviet world's 12%.

- In 1990, the big three markets -- the U.S., Western Europe, and Japan -- will still account for 88% of world computer shipments.

For the immediate future, then, it will not pay to let attention stray too far from the current major markets. There is plenty, after all, for vendors still to learn in all three, for there are important differences among them.

The European Markets

The nations of Western Europe represented a market worth $47.7 billion to the worldwide computer industry in 1985. However, despite long-standing efforts to create a "common market" of economies on the sunny side of the iron curtain, national differences still often outweigh broader concerns. The fragmentation of Europe is not congenial to nurturing corporate giants a la IBM or Fujitsu, since there are often nationalistic considerations in buy decisions.

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WORLDWIDE COMPUTER SYSTEM MARKETS, 1985
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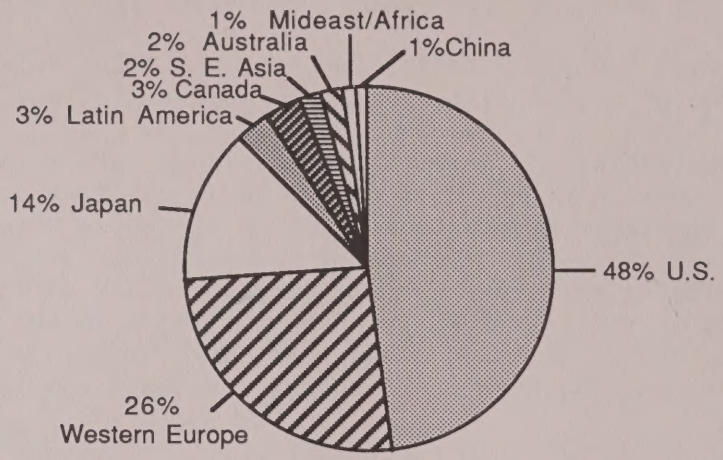
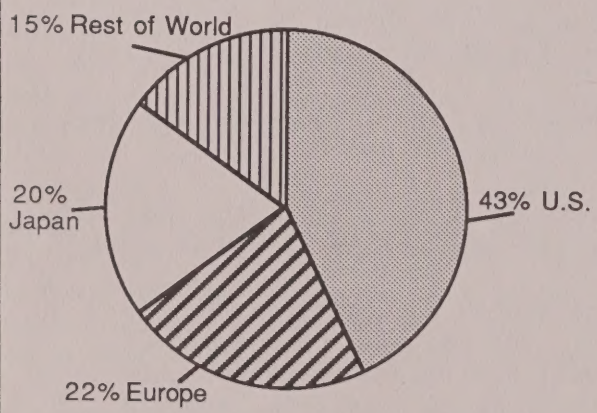
TOTAL COMPUTER SYSTEM SHIPMENTS



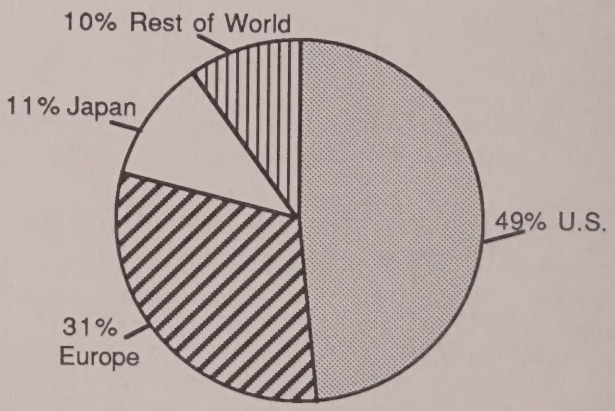
$80.5 BILLION

LARGE-SCALE SHIPMENTS



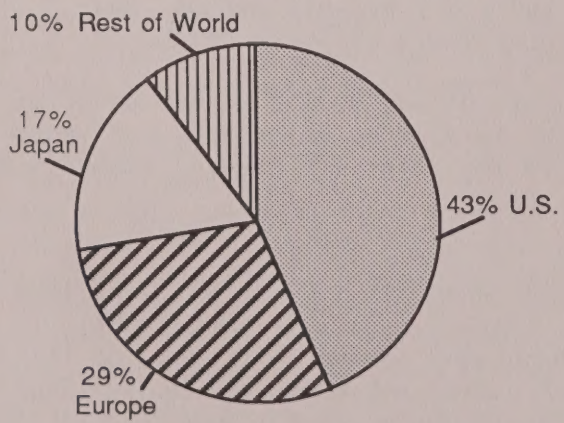
$21.6 BILLION

MEDIUM-SCALE SHIPMENTS



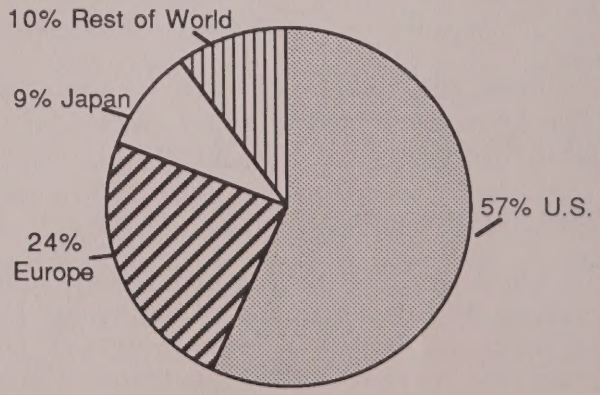
$18.1 BILLION

SMALL-SCALE SHIPMENTS



$17.6 BILLION

PC SHIPMENTS



$23.3 BILLION

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WORLDWIDE VENDOR SHARES OF ALL MULTIUSER SYSTEM SHIPMENTS, 1985
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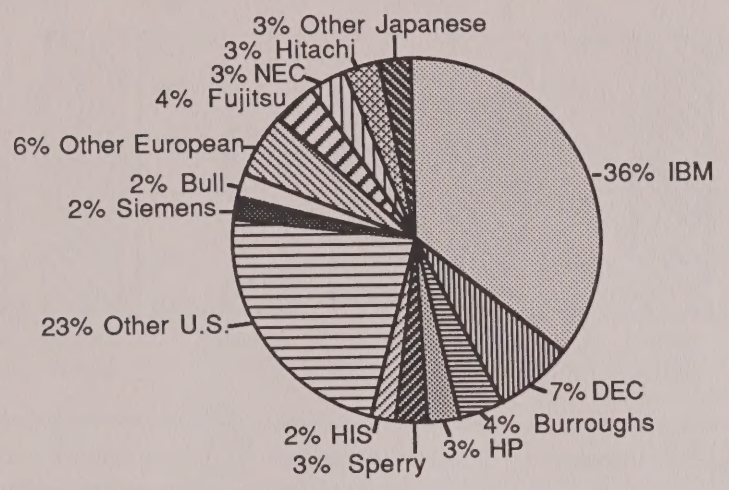

$58.0 BILLION

Some generalities, though, are still possible about the European market:

- In 1985 it represented 27% of the world market for multiuser systems and 24% of the market for PCs.

- Growth in all four processor categories will be fairly even through 1990, hovering at a point above or below 10%.

- U.S. vendors dominate in all three categories of multiuser systems: 75% of the value of large-scale shipments in Europe in 1985, 71% of medium-scale, and 65% of small-scale. The rest of the pie belongs to European vendors (as in the U.S., the only major intrusion of Japanese mainframes is through local vendors like Siemens and BASF).

- One reason for the high proportion of U.S. vendors in this market is the success of IBM, which accounted for 36% of the value of European multiuser system shipments in 1985, compared to 43% in the U.S.

In 1986 IBM is beleaguered in Europe as well as the U.S., as suggested by its admission that its international revenue stream began to silt up a little in the past quarter. However, there may be no single European beneficiary of its problems, at least for multiuser systems (in PCs, Amstrad at the low end of IBM-compatibility, at least in the U.K., and Olivetti at the business end seem to be getting most of the spoils). For one thing, a number of European multiuser vendors have also begun to report a somewhat slacker second half for 1986. Maybe the only multiuser vendor to really gain share in Europe will be Digital.

Under these circumstances, the major European multiuser system manufacturers still feel the need for strong standards bodies that can help them compete better in neighboring countries against one another, and at home against IBM. This is the reasoning behind temporary ententes like X/Open, in which the major European vendors are pressing for a standard Unix (although they are finding that before they can start pressuring IBM, they will have to muscle AT&T).

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PROPORTION OF MARKETS FOR MULTIUSER SYSTEMS SERVED BY VENDORS
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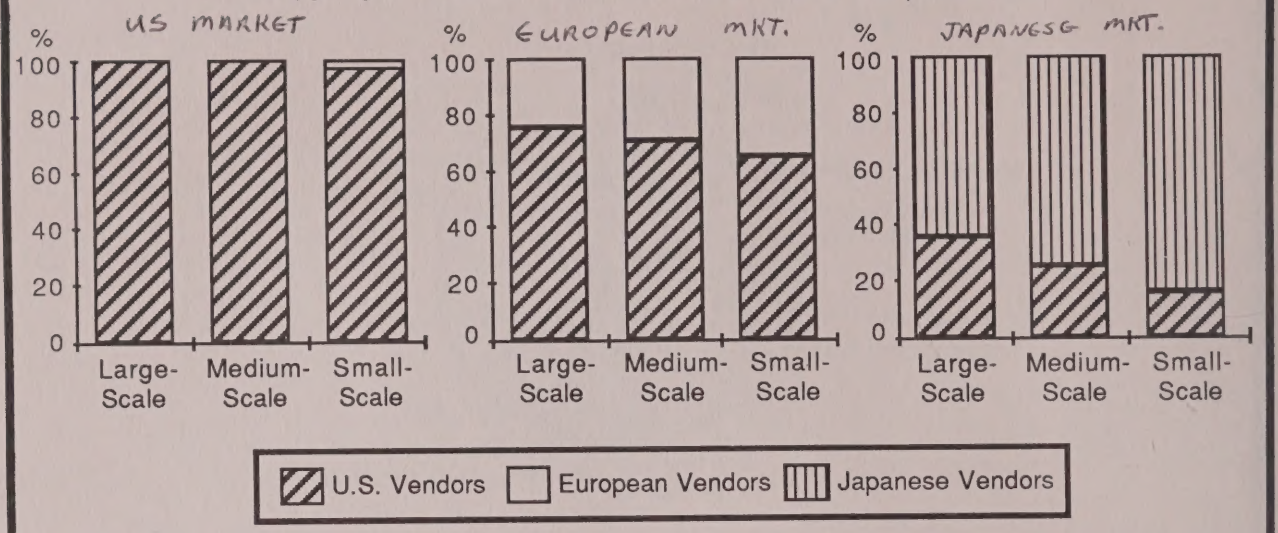

A Handful of Islands: The Japanese Market

The late Ruth Benedict instructed a generation of American social scientists on the enduring patterns of Japanese culture in her postwar classic, The Chrysanthemum and the Sword. Her message was not to push Westernization too fast but to let Japan develop new customs organically out of the old. Today the shoe is on the other foot, with a new breed of social scientists counseling Americans to engorge Japanese practices as rapidly as possible. The symbol of current Japanese success is the popular consumer-oriented product; the augury of the future for many is the high-tech prowess displayed in computers built or planned (e.g., the still inert Fifth Generation project) by Japan, Inc.

There are, to be sure, other ways of looking at the situation. Despite all the publicity, Japanese vendors accounted for just 13% of the value of worldwide multiuser system shipments in 1985 and 13% of PC unit shipments, while the Japanese market came to 11% of the world total. But those figures represent three vendors shipping more system value than the largest European computer company, and a market that absorbed over half the value of 1985 European shipments for a population just over a third as big.

The first thing to note about the Japanese market ($11.4 billion in 1985) is that, despite the geography that scatters it over four main islands, it is far more homogeneous than the huge land mass that constitutes most of the European market. For historical reasons, the manufacturing and service sectors of the economy are centered around a circle of major corporations which are closely entwined with the principal users of big-ticket items like computers.

These traditional associations are the principal constraint on American high-tech firms cracking the Japanese market, and a principal reason why non-Japanese vendors accounted for only 35% of the value of large-scale system shipments in 1985, 25% of medium-scale, and 15% of small-scale. The foreign contingency was entirely American, led by IBM Japan with 19% of the value of multiuser system shipments, its smallest share in any major market.

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WORLDWIDE PROCESSOR MARKET FORECASTS, 1985-1990, $M
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	LARGE 1985	LARGE 1990	ACGR	MEDIUM 1985	MEDIUM 1990	ACGR
U.S.	9290	11100	0.04	8760	13800	0.10
EUROPE	4770	7400	0.09	5550	9450	0.11
JAPAN	4250	6600	0.09	2010	3350	0.11
REST OF WORLD	3240	5400	0.11	1740	3000	0.12
TOTAL	21550	30500	0.07	18060	29600	0.10

	SMALL 1985	SMALL 1990	ACGR	PC 1985	PC 1990	ACGR
U.S.	7590	12200	0.10	13320	21000	0.10
EUROPE	5100	7940	0.09	5600	9610	0.11
JAPAN	3030	4130	0.06	2100	4120	0.14
ROW	1840	2900	0.10	2300	4200	0.13
TOTAL	17560	27170	0.09	23320	38930	0.11

	ALL 1985	ALL 1990	ACGR		WW 1985	WW 1990	ACGR
U.S.	38960	58100	0.08	LARGE	21550	30500	0.07
EUROPE	21020	34400	0.10	MEDIUM	18060	29600	0.10
JAPAN	11390	18200	0.10	SMALL	17560	27170	0.09
ROW	9120	15500	0.11	PC	23320	38930	0.11
TOTAL	80490	126200	0.09	TOTAL	80490	126200	0.09

While today's towering height of the yen vis-a-vis the dollar should help many U.S. firms to increase computer exports to Japan, IBM Japan won't be one of them, since it manufactures locally. However, its efforts to root itself locally pay other dividends in knowing Japanese needs and ways. For example, it is more aware than most U.S.-based vendors of the most severe problem facing future growth in the Japanese computer industry: most of the 1,000+ employees IBM Japan has been hiring annually since 1983 are software engineers, while it has established joint software development projects with major banks and a joint venture with CSK, a leading Japanese software company.

The Japanese computer market is traditionally skewed towards large-scale systems. Of the $67 billion installed base as of March 1986, large-scale systems accounted for 40%, medium-scale for 18%, small-scale for 29%, and PCs 12%. To explain the two weak spots in this profile, medium-scale systems from Japanese vendors are typically scaled-down versions of large-scale mainframes, and hence do not offer the competitive advantages of systems designed as super-minis; and Japanese PCs must tackle complex linguistic feats in mastering the 50 phonetic and 10,000 ideographic ("Kanji") characters in Japanese that have hitherto proved beyond the performance and memory capacities of most PCs. As the language problem is resolved, Japanese PC revenue should grow at around 14% p.a. through 1990, the highest rate for any processor segment in any market. The lowest growth rate in Japan through 1990 will be for small-scale systems.

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Computer Stew: IBM, Fujitsu, Hitachi, PCM's, Europe, Japan, and the U.S.

The Japanese Big Three mostly leave international distribution to others. Fujitsu has been OEMing large-scale systems to Siemens for the German market (some 280 systems to date) and shipping assemblies to Amdahl for the U.S. and most other international destinations. Meanwhile Hitachi OEMs to NAS, BASF, and Olivetti. Siemens, however, has decided to hook up with BASF and jointly market Hitachi's Sierra-class mainframes rather than Fujitsu's.

Although Siemens has also agreed to accept the forthcoming high-end Fujitsu M780 on an OEM basis next year, Hitachi clearly benefits from the new European arrangement at the expense of Fujitsu. The American fallout, though, should be the reverse: Fujitsu's partner Amdahl expects to gain sales in Europe that would otherwise have gone to Siemens, while NAS fears that broader availability of Hitachi systems from BASF/Siemens will mean additional pricing pressure.

One reason for Siemens' adding Hitachi systems is that more will be available more quickly than comparable products from Fujitsu. But the key issue for Siemens is apparently software. It is no accident to find Siemens stipulating that the M780s must, unlike earlier systems OEMed from Fujitsu, run the non-IBM-compatible BS2000 operating system developed by Siemens. The German vendor is obviously still upset about the pressure IBM exerted earlier this year on its users employing the IBM-compatible operating system developed by Fujitsu (see the Gray Sheet, Vol. 21, No. 22-23, March 28, 1986).

Hitachi no longer has a software copyright problem with IBM. The exact terms of the new agreement between the two companies have not been disclosed, but IDC Japan reports that IBM has conceded that VOS 3ES1, the newest version of Hitachi's large-scale operating system, does not infringe on the MVS/XA copyright, and that Hitachi need not continue royalty payments on it (IDC Japan estimates that Hitachi has been shelling out 700-800 million yen per month to IBM). However, Hitachi has acceded to IBM's position that "external information" necessary to interface IBM systems with others' products is also copyrightable. It supposedly paid a lump sum of 40 billion yen in June (some 10 billion more than it paid in copyright fees in 1983 after Japangate) and will pay a monthly fee for future use of the interface information.

The similar Fujitsu-IBM contretemps is still before the American Arbitration Association, where a final disposition is not expected for another three or four years. There is room, though, for an earlier compromise along the lines of the Hitachi-IBM deal. Fujitsu's MVS/XA-like operating system, the OSIV/F4 MSP E20 unveiled in 1984, has recently been revised. The new version, slated for delivery in January, is supposedly more compatible with IBM than the original, but, Fujitsu claims, is a completely original engineering feat.

IBM, which has reportedly been taking heat in Japan, might be willing to okay the new operating system if, like Hitachi, Fujitsu withdrew its claim that IBM forfeited copyright protection on "external information" by publishing it in user manuals. One catch could be that, due to its larger user base, the lump sum due IBM for interface data could be double that paid by Hitachi.

Meanwhile the clock ticks on. The IBM-Hitachi and Siemens-BASF agreements increase the pressure on Fujitsu, and a new non-IBM-compatible operating system from Fujitsu, reportedly a Unix derivative based on Amdahl's UTS, is two to three years from announcement and a decade from complete implementation.

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THE GRAY SHEET

Computer Industry REPORT

D.C.BELLOMY, EDITOR December 5, 1986 • VOL.22, NO.15 P.J.MCGOVERN, PUBLISHER

HALF-PRICE HONEYWELL: THE BUNCH RECONFIGURATION CONTINUES

The outlines of the proposed entity uniting parts of Honeywell Information Systems, Bull, and NEC have been announced. Dominating the outline is Bull.

The preliminary agreement anticipates the transfer of most of the employees, user base, manufacturing facilities, and R&D of Honeywell Information Systems to a new, thus far unnamed company (for the major exception, see below). Groupe Bull and Honeywell will each own 42.5% of the company, but Bull would be the controlling partner on the board of directors. Operations would supposedly continue under HIS managers. NEC's investment in the new company would come to 15%. The final agreement will be signed on or before next March 31 if investors and the relevant governments agree to the terms.

Thus will commence Honeywell's gradual relinquishment of a direct manufacturing and marketing role in most areas of the computer industry. Even its minority share in the new company will probably diminish, as it has an option to reduce its investment from 42.5% to 19.9% at yearend 1988. It appears, though, that Bull rather than NEC would pick up most if not all of the differential -- and Honeywell still owns part of Bull.

Also, Honeywell will be the company's largest customer, since it will continue to use HIS-developed computers internally and will integrate them with their control products for external sale. Moreover, it will retain its Federal Systems Division (FSD) as a wholly-owned subsidiary reselling the new company's computer systems, since selling to the government would otherwise risk recurrent challenges from other vendors. FSD will probably take a lot of heat even as an OEM for a company owned 57.5% by foreign corporations. In 1985, FSD accounted for $250 million of Honeywell corporate revenue, and $100 million of HIS revenue; its position will be strengthened in the future by Honeywell's acquisition from Unisys of the Sperry Aerospace group for $1.025 billion.

The Gray Sheet continues to believe that the new triumvirate is the best solution to Honeywell's long-term growth problems in the computer industry. By pooling the interests and expertise of three major players with a number of compatibilities and/or crosslicensed products, it protects the investment of Honeywell users better than HIS could have on its own, and even holds out some prospects for growth. On the other hand, two aspects of the restructuring as sketched in the preliminary proposal have troubling implications:

- Honeywell could only convince its closest friends in the industry to buy in based on a very low valuation of HIS.
- NEC is apparently still chary of tying its future in the U.S. market too closely to Honeywell's.

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Honeywell would get some $500 million on finalizing the deal, but only $150 million represents the sale of 57.5% of HIS to Bull and NEC. That would value all of HIS at around $260 million -- only 14% of HIS revenue in 1985 excluding FSD sales, and only $60 million more than the 1985 HIS operating profit.

This isn't to suggest that Honeywell is getting taken -- the financial transactions were left murky, but part of the remaining $350 million is a cash charge against the new company for "return of capital," while a low valuation of HIS now allows Honeywell to take tax advantages in 1986 that would not be available in the future (ergo a $250 million writedown on HIS book value to create "a substantial loss for the quarter and the year").

Still, the Filene's Basement bargain pricing suggests that all was not sweetness and light during the negotiations among Honeywell, Bull, and NEC. A vendor with 8% of the worldwide unit installed base of both large- and medium-scale systems should be attractive to companies accounting for 2% and 3% respectively (Bull) and 1% for each segment (NEC). But at what cost?

NEC apparently finds fence-straddling a comfortable position, at least for now. Although it would dearly love to crack the U.S. market, it is obviously not yet ready to commit itself wholeheartedly to the project initiated by Honeywell. Supplying top-of-the-line mainframe boxes to HIS ensured steady revenue and minimized risk. NEC might have liked to market a wider array of products under the Honeywell name, but the name, it seems, wasn't for sale.

With a 15% stake in the new company, NEC does the minimum necessary to maintain its ties with Honeywell and Bull, but keeps its options open. NEC's disinclination to do more could have an adverse effect on the company's prospects if it means that new NEC technology will be no more forthcoming than it has been over the past couple of years, or that the Japanese company will choose other routes to establish itself in multiuser systems in the U.S.

The proposed arrangement leaves Groupe Bull in the driver's seat. Bull's history and organizational structure were already tortuously complex even ere the latest deal. Egli Bull was founded in 1930 in Zurich to manufacture tabulating machines invented by Frederick R. Bull, a Norwegian engineer; the Parisian operations were spun off in 1933 as Compagnie de Machines Bull (CMB). In 1964 GE bought a majority share of CMB, but its two-thirds interest was in turn purchased by Honeywell in 1970 in conjunction with the acquisition of GE's other computer business. A merger with Compagnie Internationale pour l'Informatique produced CII-Honeywell Bull in 1976; legal control of three small information industry companies in 1983 led to the Groupe Bull name.

In 1982 Honeywell still owned 47% of Bull, but the new socialist government in France was anxious to bring key industries under state control. Bull was therefore divided into two segments, with Honeywell retaining smaller chunks of each. It maintains a 19.9% stake in CII Honeywell Bull International, which serves South America and some parts of Europe. It holds only 2% of Bull S.A., the principal manufacturing and marketing arm of Bull. It is Bull S.A., for example, that controls Bull Corporation of America, which runs the smart card and peripherals businesses and office automation/microcomputer R&D that have

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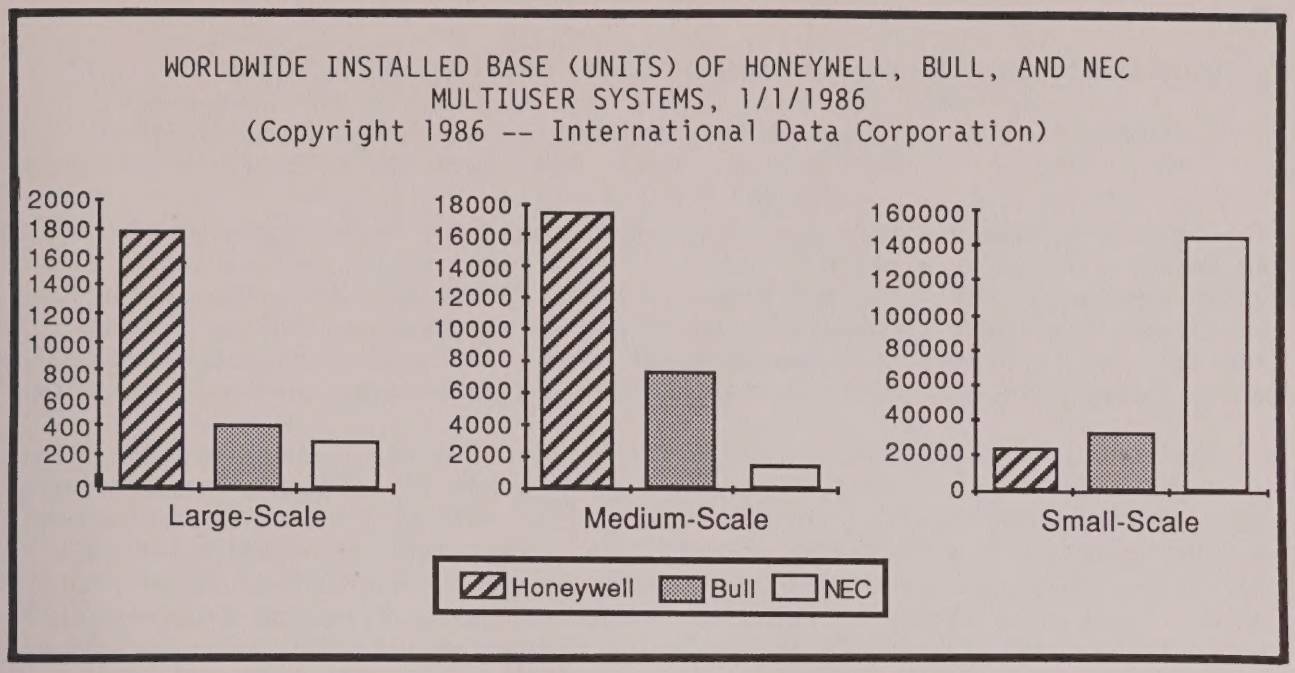

comprised the corporation's only U.S. presence up to now. Meanwhile CII Honeywell Bull International and Bull S.A. were considered subsidiaries of CMB, 97% of whose stock has been owned by the French government since 1983.

The change in ownership further complicated Honeywell and Bull relations. Bull has been marketing and, in some cases, manufacturing Honeywell-designed products in most of Europe (most importantly, France and Germany), South America, and some other parts of the world, while elsewhere Honeywell has marketed its line plus one Bull-developed product (the DPS 7) and the DSA network architecture that was jointly developed with Bull. Honeywell received Japan in the division of markets, but sold its subsidiary there to NEC in 1985.

No, there won't be a quiz. But some appreciation of the intricate interlacing of Bull and Honeywell interests is required to understand why Bull would be so much more forward than NEC in the financial share and overall direction it is willing to commit to the new entity.

At the point when Honeywell relinquished control of Bull just four years ago, no one could have predicted the role reversal that the proposed restructuring of HIS portends. Bull seemed to be on the ropes, with three years of consecutive if diminishing losses from 1982 through 1984. However, in 1985 it reemerged into the black with a profit of $12 million, a figure it expects to double in 1986. Its revenue of $1.8 billion in 1985 represented 18.5% growth.

Bull P.R. attributes the turnaround to the "rehabilitation" program initiated by Jacques Stern, the CEO selected by the French government in 1982, and Francis Lorentz, a civil servant brought in by Stern to function as the equivalent of COO. This brings up another question for the restructured HIS, though. Plans are now under way by the Chirac government to gradually sell off most of the French state's stock in CMB and return it to private control. It is too soon to predict what will then happen to the current management team, or to plans associated with it -- plans like directing the entity succeeding HIS.

Nevertheless, if there remain problems and questions, the entity still seems more auspicious for Honeywell than the alternative: the status quo ante.

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A CONGERIES OF RELATIONSHIPS: ACADEMIA AND MAJOR VENDORS IN 1986

"Education is an ornament in prosperity and a refuge in adversity."
-Attributed to Aristotle

The Great Softness has accelerated a trend among many major computer vendors to emphasize particular markets. Sometimes this means playing closer attention to VARs, sometimes beefing up homegrown vertical marketing with software and hardware better tailored to specific needs, and sales personnel better trained to address varying styles and computational requirements in specialized environments. Among these specialized markets few are more vital than academia.

And few are as complex, for higher education and the computer industry are entangled in an intricate web of relationships, usually mutually reinforcing but sometimes conflicting. In the first place, colleges and universities are not one market but a series of markets. Decentralized organization, where decision-making is typically at the departmental or even individual faculty member level, and disparate needs (teaching vs. research vs. administration; engineering/computer science vs. business schools vs. liberal arts, ad infinitum) mean that no single approach or point of contact will suffice for success.

Even more daunting is the variety of roles that academia and computer vendors must play vis-a-vis one another. Besides their position as important buyers, institutions of higher education are simultaneously suitors for philanthropic dollars and cut-rate or free equipment from vendors; the source of key research in computer science, some of it contracted by vendors, some of it sparked by would-be entrepreneurs hoping to augment or escape academic salaries; a major participant (sometimes in concert with the government) in scientific research requiring computers at the cutting edge of current technology; and an indispensable training ground for future employees and users alike.

One side effect of this labyrinthine complex of relationships has been to create on many campuses what is rapidly becoming virtually a caricature of a major problem in corporate computing. No current processing environment is as heterogeneous as a large American university, where Apple IIs may coexist with Cray IIs -- where, in a mythical but not atypical example, the central administration works with an IBM 3081, but the history department keeps records on a VAX 750 running VMS; the Nobel Prize winner in chemistry has the clout to buy a Cyber 205; the med school has wheedled a DPS 88; the freshman comp course has received a grant to use Macintoshes; the business school has arranged for all students to purchase a Compaq portable; the astrophysics department runs Ultrix on its VAX 8600; the mechanical engineering department licenses 4.2 Unix for its Sun workstations; and the architecture school has a network of Apollo workstations running Unix V.

The central MIS function at a number of universities is therefore changing even more rapidly than in the commercial universe. The computer center still handles the computational needs for departments, usually in the liberal arts, that have not yet acquired their own systems, and for faculty or graduate researchers who need higher performance than is available locally. However, there are often surplus MIPS that several institutions rent out to nearby governmental organs and businesses. But the most important roles for academic MIS shops are to advise and train personnel at the lower levels, and to plan for the urgent project looming as the key issue for the next decade: building campuswide networks across the multivendor morass.

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These networks will be at least as complicated as the ones that still stymie planners in commerce and manufacturing. They will have to offer semitransparent communication stretching across miles, through dormitories, classrooms, and detached research facilities; allow access to students and faculty living off campus; and permit a human interface that can seduce the many academics whose notion of high tech still stops with an IBM Selectric.

Over the past couple of years several vendors have attempted to organize and rationalize their relations with academia. To understand how and why approaches differ, the Gray Sheet spoke with responsible individuals at the three vendors with the largest number of multiuser systems in ivied halls.

IBM. In a little over a decade, IBM's annual University Study Conference has grown from a handful of representatives from IBM and major universities to a four-day extravaganza organized by Academic Information Systems (ACIS), IBM's business unit devoted to academic matters. The eleventh edition, held November 16-19 at a Fort Lauderdale hotel, drew 550 attendees, 330 from over 100 universities and most of the remainder from IBM. Presentations were offered by nearly 150 academic personnel and 50 IBM employees; there were also 95 exhibits of educational computing projects funded in whole or part by IBM.

The 1986 conference's theme was encapsulated in an address on "The Evolving Partnership Between Universities and Industry" by George Beitzel, an IBM senior vice president. However, the choice of topics and papers was an even better guide to IBM and academia's interlocking interests. Several dealt with developing technologies like AI and parallel processing that both are actively pursuing; others dealt with lucrative new markets that individual professors and corporate giants alike want to cash in on. As the session on electronic publishing demonstrated, academics too know acronyms like "WYSIWYG."

Nevertheless, IBM's relations with academe are far more complex than the easy comraderie of the conference might suggest. This is probably inevitable, since IBM by itself is nearly as diverse as many educational institutions.

Sales to the academic community are handled by the regular sales divisions. Any university is sufficiently large to merit a separate account officer. However, because IBM has not really honed in on vertical markets of any stripe, this individual may or may not understand the academic market's unique needs.

Although IBM has the biggest vendor presence on campus, university sales are less crucial to it than to some of its competitors. Of more importance seem to be its relations with researchers and teachers. From 1980 to 1985, the number of R&D contracts and joint studies with academia signed off on by IBM grew from 110 worth under $5 million at 70 universities to over 600 worth more than $100 million at around 200 educational institutions. In that time frame IBM distributed an additional $350 million (book value) in cash, equipment, and IBM employees' time to colleges and universities. In 1985 alone, IBM support to higher education, including $9.7 million in two-for-one grant matching of employees' contributions to academic institutions, totaled $71 million.

One program of which IBM is particularly proud is run out of University Relations, a small office in corporate headquarters that controls outright grants. IBM noted that in several crucial areas, institutions of higher education were not training enough students. In response it has inaugurated annual grant competitions for curriculum development.

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Three competitions are now at different levels of completion. The first, launched in 1984, rewarded plans for CAD/CAM instruction (a separate program for junior college CAD and drafting curricula has also been set up). The 1985 initiative was MIS training, while the 1986 target is materials and processing sciences. To date over $100 million has been dispersed to 52 winners.

The beauty of the project is that it stretches IBM's grant dollars so far, since the number of new academic programs attributable to it will likely be roughly double the number of winners. In the CAD/CAM project, the best test because the furthest along, the majority of institutions that submit a proposal establish the program they have worked up, whether or not IBM funds it. The commitment in planning time and intellectual excitement has already been made; they usually go elsewhere for the financial commitment if IBM won't ante up.

Meanwhile winners and losers alike will be assuming part of IBM's training expenses. Over the last three years IBM hired 10,000 new college grads; in 1984, before the Great Softness hit, it hired more young people with the ink still wet on their sheepskins than any other employer in the private sector. But just as important as training future employees is the project's potential to develop crucial markets by increasing the number of knowledge workers in the user base trained in a particular area of expertise.

Neither is IBM particularly magnanimous in the cash and equipment it pours into applied research. Beitzel explained the purpose of the 3090-400 installed at Cornell in October as "to provide supercomputer capacity for the nation's research community -- something that has been very limited up to now;" just as important for IBM, though, is the research community's hitherto limited perception that 3090s with VF attachments offer supercomputer capacity.

In the area of networking, the issue isn't making a market aware of IBM offerings; it's developing expertise in an area where IBM has been deficient. In cooperating with universities planning their own networks, it can draw on the experience of academics and experiment with implementing heterogeneous communications without risking the backlash that delays, inelegancies, or outright failures could generate in commercial and manufacturing environments. IBM has networking agreements with several universities, but the centerpiece is its partnership with Carnegie-Mellon in creating CMU's "Andrew" network.

Many projects arise out of personal contacts between academics and the relevant segment of IBM. Cornell's Ken Wilson, for example, is adept at eliciting corporate support for his supercomputer efforts. In other cases, professors and IBM employees working in areas like expert systems will often know each other from graduate school or professional organizations. IBM nevertheless needs a filter for proposals, and a nexus of academic contacts to solicit contracts from the right individuals at the right universities.

Enter ACIS, established in December 1982. It initiates contracts through contacts at the IBM science centers it runs and through attendance at conferences. Moreover, its mandate extends to filling the gaps in other aspects of IBM's relations with academe. If grants or non-ACIS contracts involve IBM equipment, ACIS personnel will keep a corner of an eye on it. If the account officer doesn't mesh with the university environment, ACIS will act as a mediating "overlay" for the marketing arm. And ACIS conferences in Fort Lauderdale don't hurt relations, even if wining did not accompany the dining and participants were sequestered half an hour from the beaches.

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Nevertheless, the creation of ACIS marked only an initial awareness that IBM had allowed its ties with universities, once the strongest in the industry, to begin to fray. It is becoming, but is not yet, a strong organizational center for corporate relations with academia. For example, many contracts are still signed between individual professors and managers of IBM units that completely bypass scrutiny by ACIS or anyone else in upper management at IBM.

Digital. Certainly one of the most successful vendors in establishing and maintaining close ties with academia has been Digital. In 1983 it established an Educational Investment Board to coordinate the activities and plans of three units devoted to the three varieties of relations with higher education that Digital has identified: marketing, philanthropy, and research contracts.

EDU is the market group devoted exclusively to educational sales. Building on its historic strength in timesharing, Digital is still concentrated in engineering and laboratory sciences, but is growing in business schools and administration. It is also playing off the company's current marketing thrust with its Campuswide Program to network systems of all vendors across an entire campus. Among the 12 or 13 sites participating are Iowa State, the University of New Hampshire, Johns Hopkins, and the University of Massachusetts.

Philanthropy is funneled through Corporate Community Relations. Grants are typically of two types, matching individual contributions and "quality of life" dispersals (e.g., bringing more women and minorities into engineering); Digital, however, would much prefer giving equipment to cash.

Research contracts are run from the External Research office of the Vice President of Research -- i.e., they are considered another element of Digital's R&D effort in new technology. This year's figure for academic research should approach $30 million in cash, equipment, and personnel time (15 Digital employees are currently deployed on campus). The closest equivalent to IBM's CMU project is Project Athena at M.I.T., to which Digital has contributed $70 million over five years. However, Digital notes that, unlike the IBM-CMU relationship, none of its contracts involve proprietary research.

Control Data. CDC's position in the academic market, particularly for scientific computing, is also a traditional strength. Education has been pinpointed as one of CDC's key lines of business, for which a special market and support group was established in late 1984. There are still as many Cyber 205s in U.S. universities as Crays, and Florida State will be the first ETA supercomputer site. Plato courseware for higher education is now profitable, while Eden software for college administration has been added.

However, CDC's weaker financial position than IBM or Digital forces it to focus its philanthropic activities far more tightly. The only major grant activity is a fellowship for graduate programs and first-year postdocs to work on parallel processing or supercomputers. CDC's major initiative is currently its Engineering Center Program, which was established after the company realized that much of the technology developed on Cybers lent to academia in fact flowed to private industry. The engineering centers are designed to be partnerships between the educational institution, which makes available the organizational entity and faculty resources; a private company, which puts up the money for the research it wants; and Control Data, which sells the hardware and software required. To date CDC seems to be succeeding in its new strategy. There are currently 23 engineering centers, half of them specializing in CIM.

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• HONEYWELL REORGANIZATION. NEC and Bull, which were apprised beforehand, will apparently allow Honeywell's reorganization of HIS, unveiled a week before the restructuring announcement, to be incorporated in the new entity. Although moving from a size-class to a functional organization (strategy and technology, product operations, marketing and planning, sales and service), Honeywell tuned the announcement to emphasize its low end in departmental and networking environments. A company spokesperson explained to the Gray Sheet that the HIS mainframe identity is already well established and needed no underlining, but it may be worth noting that departmental systems and networking are the areas where Bull and Honeywell have cooperated the most closely.

• UNISYS MOVES. Besides selling the Sperry Aerospace group to Honeywell for $1.025 billion and Sperry Microwave to Hercules Aerospace for $42 million, Unisys has announced that all marketing will be channeled through Line of Business (LOB) units. The four U.S. LOBs will be communications and airlines; financial; public sector; and industrial and commercial systems. All report to Joseph Kroger, the former Sperry exec who as the Unisys marketing czar is divvying up appointments between ex-Burroughs and ex-Sperry people.

• CDC LOSES GAMBLE, KEEPS JACKPOT. First the bad news: CDC has scrubbed the plan to sell Ticketron to Allen & Company after several states would not transfer the distribution of lottery tickets and OTB forms because Ticketron's would-be buyer is a privately held company. Now the good news: CDC gets to keep a proven cash cow after news of the sale was one factor in partially restoring investor confidence. Sometimes you <u>can</u> eat your cake and have it too.

• THE DOCTOR'S DYNASTY. By assuming the title of president of Wang that his father had held since John Cunningham's resignation, Fred Wang adds overall responsibility for sales and marketing to his previous duties in manufacturing and R&D and allows An Wang to start retreating from the highly visible, physically taxing role he has had to play for the past year and a half.

• STORAGETEK/IRS RULING. The U.S. Bankruptcy Court is backing StorageTek in its interpretation of how much is due the IRS, but the Justice Department plans to appeal. If the ruling holds, Ryal Poppa's plan to bring StorageTek out from under Chapter 11 protection in the first half of 1987 can be redeemed.

• MCC TRADE. The departure of BMC Industries from MCC due to the planned sale of its Interconics Division has been more than counterbalanced by the addition of Hewlett-Packard, which will buy out BMC's investment in the MCC Semiconductor Packaging/Interconnect Program. Adding a key holdout so soon after the announcement of B.R. Inman's impending departure is a salutary vote of confidence in MCC's future. Inman will join a new high-tech defense consortium but has expressed his distaste for returning to government service.

• SHUSHMAIL. Relations between GM's Roger Smith and EDS's H. Ross Perot had grown so tense that General Motors first initiated an abortive move to sell its Electronic Data Corporation subsidiary in whole or part to AT&T, and then bought back Perot's stock for $750 million in return for his resignation from the boards of GM and EDS and from his position as chairman/CEO of EDS. Future case studies of GM by students at the Harvard Business School should probably include a year's supply of "Dallas" scripts.

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THE GRAY SHEET
Computer Industry
REPORT

D.C.BELLOMY, EDITOR November 14, 1986 • VOL.22,NO.13-14 P.J.MCGOVERN, PUBLISHER

Review and Forecast update for 1986 inside

LOCAL AREA VAXCLUSTERS: DIGITAL POACHES ON APOLLO'S DOMAIN

The most memorable Olsenism at Digital's product announcement cum shareholder's meeting in Boston on November 6 came when Ken Olsen laid out the ground rules for the Q and A session. "Ask any question except, don't you know any better than to stand up in a canoe?" He also confessed that his wife had already asked him the other question raised by the notorious full-page color photo in Fortune: "Don't you know any better than to not button your shirt?"

Trailing not far behind were other comments that give the president of Digital's perspective on his company's current strategy. However the Red Sox may have fared, "In the World Series of networking, we're winning all the games." Olsen ascribed this development to the offseason trade in which Digital shifted from its hardware orientation to a position he twice described as, "We are, I think you could say today, a software company."

To underscore the sea change in Digital's attitude toward networking, other system software, and application programs, Olsen admitted that when he first saw a VAXCluster, he thought it too complex and difficult to sell. Digital has so far installed 5,000 VAXClusters, which have become a centerpiece of corporate strategy. They offer the modularity that many users desire, potential performance levels to compete with IBM mainframes and multiprocessor startups, and distributed processing to take advantage of the range of VAX systems.

On November 6 Digital began to fill the most obvious gap in VAXClustering by extending the concept to MicroVAX II systems (including VAXStations and GPX workstations) to the work area. Local Area VAXClusters over Ethernet incorporate most of the elements that VAXClusters have offered, among them distributed computing and transparent load balancing, plus file sharing at the record rather than file level. The older siblings can do things that the Local Area VAXClusters can't, like volume shadowing for fault tolerance, but rewriting some controller code could provide similar functionality.

The Local Area VAXClusters also include functions specifically tailored to appeal to information managers in a decentralized work area:

- Better control of applications and the database by the system manager.
- For certain applications, cost reduction and, more importantly, increased security through diskless workstations.
- Cost savings through volume software pricing and monthly flat fee licenses for a portfolio of programs.

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In a Local Area VAXCluster, up to 13 (a limit that will eventually be extended upward) MicroVAX/VAXStation clients can be attached to a server system, which can then be connected via Ethernet to other Local Area VAXClusters or standalone VAX systems. The server manages the system software (operating system, DECnet, and Ethernet) and as much of the application software as a user chooses to make available in a shared central file.

The server can be any VAX processor from MicroVAX II to 8800, depending on the applications to be run. Digital says that it has found that a MicroVAX II server offers sufficient disk support and performance for most ECAD work. Complex tasks, however, will require a lot of planning by Digital and the user. A customer's interest in adopting local clusters for seismic analysis led Digital engineers to experiment with possible configurations. The solution turned out to be an 8500 server with three MicroVAX clients loaded to the max.

If a MicroVAX II has enough horsepower for the user's needs to function as server, Digital has announced three configurations: with 5MB of memory, a 71MB disk for local paging and swapping, and network interface, $19,900; with 16MB of memory without disks, $24,400; and the full configuration with 16MB of memory, a 456MB RA81 disk, TU81-Plus tape drive, and software, for $94,855.

Two diskless color GPX workstations were announced as candidates for client clustering: an entry-level system for $19,900 with floating point unit, 19" monitor, 5MB of memory, and 4-plane graphics coprocessor; and the same system with an 8-plane coprocessor for $23,900. Apollo and Sun have found that in many instances the convenience, and often the necessity, of allowing end users to maintain individual files on local storage have outweighed the savings on diskless workstations. However, Digital emphasizes the advantages of diskless nodes for maintaining security and database integrity in specific corporate environments, including some ECAD applications and software development.

At the present time Local Area VAXClusters are restricted to the VMS world, although there were intimations that Ultrix support will follow. Network-oriented software pricing comes in two flavors. Volume pricing, Digital's alternative to site licensing, establishes a special schedule for single products beneath the regular volume discounts; the software portfolio program gives supposedly comparable savings for monthly flat license fees on three options covering groups of software development and information management products. Both are available on MicroVAX II and VAXStation systems without the Local Area VAXCluster, but will probably prove most attractive in that environment.

As will typically be the case as long as the ad line remains "Digital has it now," all products announced on November 6 are available immediately.

To place the new products in historical perspective, Olsen followed Hegel, Auguste Comte, and other distinguished forerunners by invoking the philosopher of history's version of the Rule of Three: any length of time can be divided into three periods. In this case, Olsen described the first phase of networking as getting computers to communicate with one another, and offered this tidbit for Trivial Pursuit addicts: the first modem was invented in Cambridge, Massachusetts, six months after the Russians exploded their first A-bomb.

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Olsen's second period was networking proper. The example chosen, not surprisingly, was DECNet, but Ethernet and the VAXCluster also qualify.

The third age as defined by Olsen is just now emerging: the work group, in which more sophisticated networking facilitates distributed processing and a productive blend of group interaction, individual initiative, and managerial control within the local workplace. Not long ago this phase might have been called the LAN era, but Digital may have decided that users are getting tired of oft-repeated but undelivered promises, and that it has a chance to define the issue for its own purposes before the Year of the LAN finally does dawn. September's VMS Services for DOS and PC All-in-1 were billed as the first in a series of work group announcements; Local Area VAXClusters are the second.

In September Digital could legitimately portray itself as a trailblazer, but others have pioneered the terrain in which the Local Area VAXClusters will compete. In particular, much of Apollo's appeal has been based on its ability to offer technical work groups a similar blend of functions on its Domain operating environment, which also allows for an integration of individual and group enterprise through distributed processing on workstations.

The most prevalent examples chosen at the Local Area VAXCluster announcement and the decision to introduce diskless nodes indicate that Apollo and Sun are major targets for the new products. It should be noted that the two workstation leaders still have significant competitive advantages in this arena that could protect them from Digital in the short term (e.g., better graphics than the GPX offers as yet; higher performance at the workstation without calling on a server; and Unix, increasingly the standard for workstations).

Digital's principal advantage is that MicroVAX systems in a Local Area VAXCluster can communicate seamlessly with other VAX systems over Ethernet, and Digital already has a very visible presence outside the work area in the environments that Apollo and Sun now serve. Under the circumstances, choosing to implement Local Area VAXClusters in VMS first rather than Ultrix makes sense.

Moreover, Digital has longer-term options, including adding Ultrix and increasing performance levels (for example, a second-generation MicroVAX II with maybe double the MIPS could come as early as the first half of 1987). When Digital builds its promised bridges between VMS and Ultrix, its MicroVAX-based systems and Local Area VAXClusters could prove a potent combination for a large class of workstation users who have hitherto considered only Apollo and Sun.

In the meantime Digital is also looking at less technical markets, some of which will be addressed in pending announcements of work group solutions for specific application areas. Among uses cited at the announcement would be computer electronic publishing, financial modeling, portfolio management, and office automation. The November 6 announcement was not geared towards OA (the heavy I/O in office work, for example, excludes diskless workstations), but it was noted that PC All-in-1 could easily reside on the cluster server to be downloaded onto MicroVAX IIs attached to IBM-compatible PCs. For the nonce VMS Services for DOS cannot be clustered, but this can supposedly be remedied.

Thus, as the first, necessarily incomplete step in MicroVAX clustering, the new product begins to fulfil Digital's promise for better networking solutions. Not coincidentally, it should also help Digital reach the goal for which it has become a "software company" -- selling more hardware, in this case MicroVAXs.

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OR IS IT MEMOREX?

As expected, Burroughs has sold most of its Memorex subsidiary to raise the promised cash to retire some of the debt it accumulated in acquiring Sperry. What was not necessarily anticipated was that, rather than sell it to any of the established industry players with whom it has been rumored to be conducting negotiations over the past several months, Burroughs has chosen a route that could keep the Memorex name and product line pretty much intact.

A group comprised predominantly of old Memorex hands from international marketing will buy Memorex's PCM sales and service arm, communications engineering and manufacturing (i.e., its 3270 business), and media products. Burroughs will receive around $550 million, mostly in cash, along with an unstated amount of preferred stock that will not give it any say in Memorex operations. Pending financing, the deal is supposed to be finalized by the end of the year.

The central figure, who will be the CEO of the refashioned company, is Giorgio Ronchi, VP for Southern Europe and Latin America. Most of the rest of the group have served under Ronchi in France, Italy, and Latin America. Reflecting the nature of the new leadership, Memorex corporate headquarters will be moved to London. The Memorexecs will be joined by Eli S. Jacobs, a New York investor who will help fund the buyout, and will receive assistance from Drexel Burnham Lambert in raising the rest of the requisite capital.

As recently signaled by Burroughs' transferring supervision of large-scale storage production from Memorex to the mother ship, manufacture of 3380-class devices will be retained by Burroughs. It will use them on Burroughs/Sperry mainframes, and OEM them to Memorex for the PCM market. Burroughs will therefore keep what has been the headquarters campus of Memorex, since the Santa Clara site has also been the locus of most storage production.

Around 2,000 Santa Clara employees and 1,000 elsewhere will be transferred from Memorex to Burroughs. Another 1,600 Santa Clara employees will work out of other Memorex-owned buildings in the city, where 3270 manufacturing is concentrated. These buildings will become the North American headquarters of Memorex, which except for the 3270 production will now be essentially a PCM middleman between manufacturers like Burroughs or Hitachi and the end user.

Twenty-five-year-old Memorex had begun to turn the corner from an extended period of unprofitability. Its 3380 line finally had gotten the bugs out, and it had just announced a flurry of new products on October 20 (e.g., production shipment of its 3888-23 disk cache storage control unit, availability of its 3682 double-density equivalent to IBM's 3380-E drives in the first quarter of 1987, and four intelligent AT-compatible 3270 workstations based on Sperry's Mitsubishi-engined IT and MicroIT PCs). However, the uncertainty about the future status of Memorex had reportedly begun to erode sales. The Memorex installed base will likely approve a transition that involves so little change.

THE BUNCH IS DEAD -- LONG LIVE THE UNCH

Okay, Unisys sounds more like another Unix startup than the winner in the $5,000 sweepstakes to find a new name for the Burroughs-Sperry combination. And there's no denying that it doesn't exactly trip lightly from the tongue. But you'll get used to it. After all, it's more euphonious than Univac, and you probably think that sounded pretty glamorous.

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1986 REVIEW AND FORECAST UPDATE

THE GREAT SOFTNESS, YEAR TWO

In today's climate of uncertainty, Gray Sheet readers need to keep abreast of alterations in the computer market. Fortunately, IDC has the tools to fine tune its estimations of current market conditions and projections of future developments. The latest, and potentially one of the most critical, was discussed in the last issue: IDC's quarterly survey of user buying intentions.

In the past the best way to keep up to date with IDC's review and forecast of the market was to be an IDC client, attend the March briefing session, read the Gray Sheet's R&F issues, and order either the Processor Data Book or the Gray Sheet's Review and Forecast Special Report. The Gray Sheet firmly believes that such a regimen is good exercise, but appreciates that some readers might like to tone up their intellectual muscles less rigorously.

The Gray Sheet is therefore going to experiment with periodic updates of its famous "red page" summaries of the market -- and to make them still more convenient, it will dispense with the red ink (a potential sore spot for some anyhow). To start things out, this issue prints the latest 1986 figures.

Readers should note that the tables and graphs that follow do not take account of two crucial elements that will be taken into consideration when the initial 1987 summaries are prepared next year: how well the industry actually does in the crucial fourth quarter, and what IDC's annual census of computer installations indicates for 1986. However, the trends as they appear to be developing at this point in time offer significant evidence about the continuing Great Softness in the computer market.

VALUE OF U.S. AND INTERNATIONAL COMPUTER SYSTEM SHIPMENTS
BY SIZE CLASS, 1986
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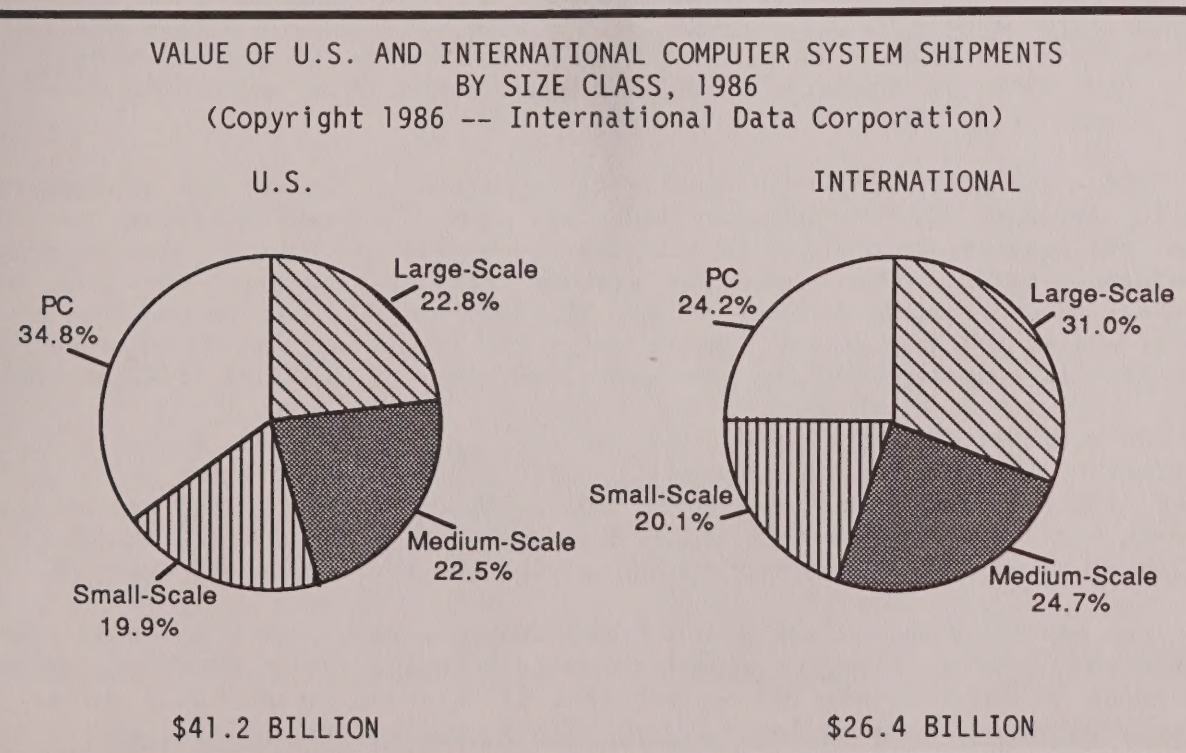

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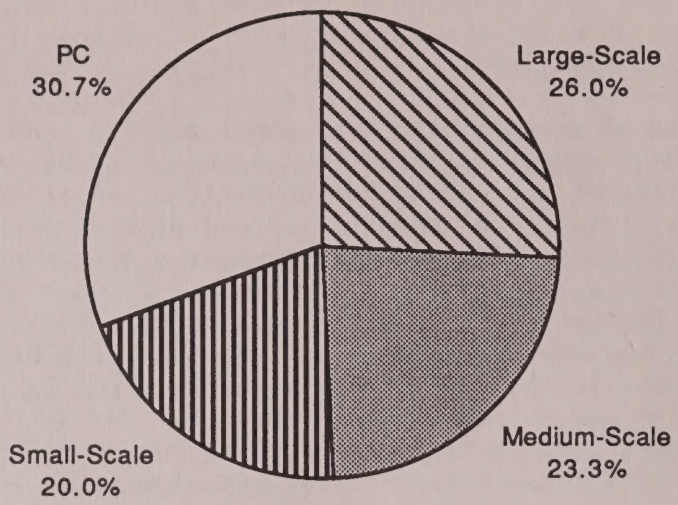

$67.5 BILLION

If the rest of 1986 develops as the Gray Sheet currently expects:

- Due in large part to IBM's faltering, shipment value for U.S.-based manufacturers in 1986 would be around $67.5 billion, for an annual growth of just over 7% -- significantly less than last year's 9%.

- The U.S. market would grow under 6% to $41.2 billion, partially balanced by a 10% growth in the value of international shipments.

- The weakest growth will be in large-scale systems, where U.S. shipment value would grow only around 1% to $9.4 billion.

- The most dramatic change continues to be in the PC market, where the rise in the value of worldwide shipments (U.S. manufacturers) would slip under 9%.

The anticipated PC growth highlights an important feature of contemporary market dynamics for the computer industry. For the past two years, each of the four segments into which IDC divides the market has been growing at roughly comparable rates, with large-scale systems trailing slightly. Last year's 9% overall growth comprised rates of 5%, 9%, 11%, and 11% for large-, medium-, small-scale, and PC systems respectively; the projected overall growth of 7% for 1986 is comprised, in the same order, of rates of 3.5%, 8%, 10%, and 9%.

In contrast, overall growth figures earlier in the 1980s masked sharply different rates within the segments. Large-scale shipment value swung wildly from -22% to +81% during the 1980-82 mainframe transition, while medium-scale growth has been as low as -1% and as high as +41%. From 1980-85, worldwide PC shipment value doubled two years running, and for two others was over 50%.

One way to interpret the shift from sharply asymmetrical growth is that, for higher overall industry growth rates to be achieved, at least one segment is going to have to take off -- but that if it does, others will in all likelihood have to endure lower rates. Too much symmetry spells stagnation.

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ANNUAL GROWTH OF VALUE OF COMPUTER SYSTEM SHIPMENTS BY U.S.-BASED VENDORS, 1980-1986, OVERALL AND BY INDUSTRY SEGMENTS
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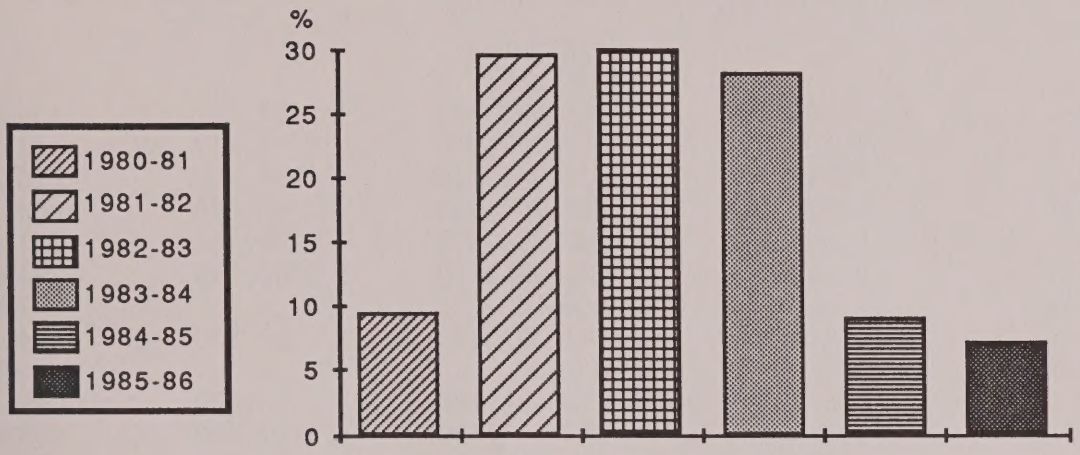
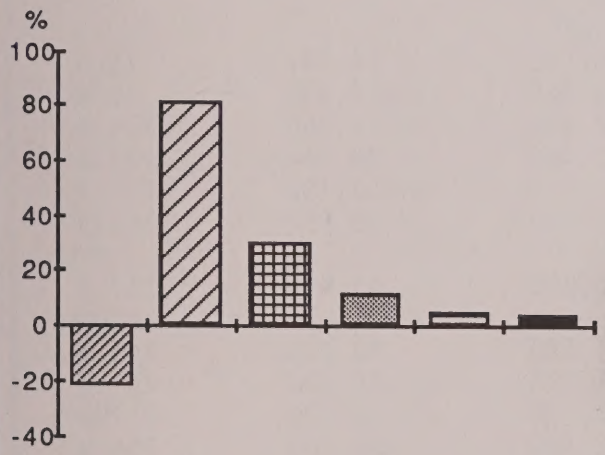
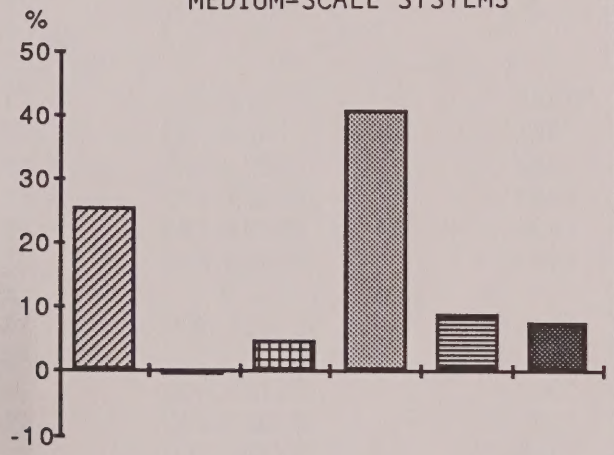
OVERALL



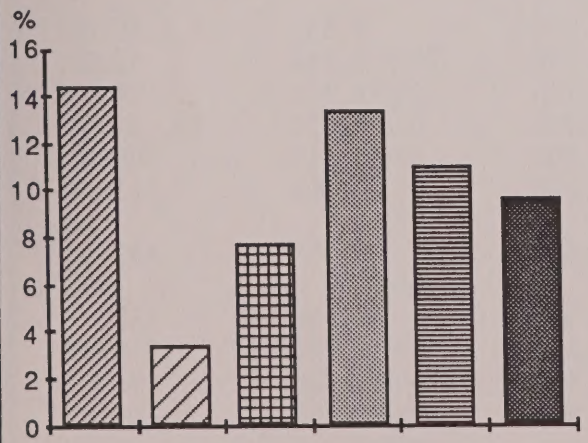
LARGE-SCALE SYSTEMS



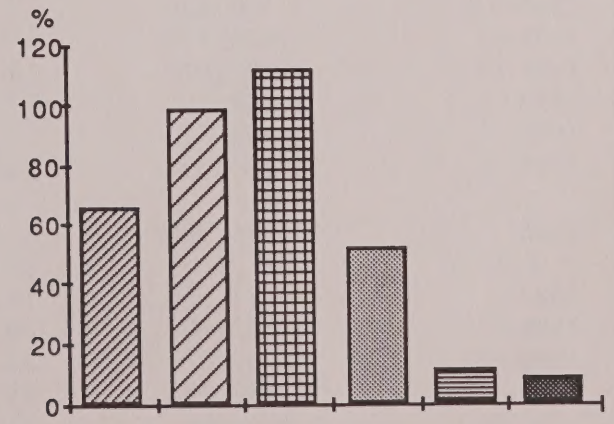
MEDIUM-SCALE SYSTEMS



SMALL-SCALE SYSTEMS



PCs



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COMPUTER MARKET SUMMARY -- U.S.-BASED MANUFACTURERS*
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	Number of Systems Shipped	Cumulative Number in Use	$ Million Value Shipped	$ Billion Value in Use
		WORLDWIDE		
1980	702,280	1,988,570	24,522	134.0
1981	1,138,210	3,083,010	26,817	148.9
1982	4,049,700	7,044,730	34,698	175.1
1983	7,936,780	15,056,330	45,094	208.7
1984	10,051,200	25,056,810	57,768	251.5
1985	9,196,290	33,876,700	62,970	293.3
1986	10,218,860	42,307,270	67,530	344.9
1987	11,574,480	53,191,730	73,470	397.2
1988	12,886,530	62,542,730	80,920	456.5
1989	14,079,080	69,278,840	88,890	513.5
1990	15,215,700	75,107,280	96,500	575.7
		UNITED STATES		
1980	512,020	1,406,480	14,991	75.0
1981	783,790	2,167,420	16,935	86.4
1982	3,053,880	5,132,370	22,290	104.1
1983	6,079,190	11,173,400	28,764	126.2
1984	6,852,590	18,001,210	37,152	154.7
1985	5,932,200	23,882,500	38,962	181.9
1986	6,631,900	29,350,200	41,175	211.6
1987	7,452,930	36,391,150	44,240	245.1
1988	8,323,830	42,081,310	48,700	281.8
1989	9,370,060	45,881,370	53,590	317.0
1990	10,217,500	49,815,780	58,100	354.9
		INTERNATIONAL		
1980	190,260	582,090	9,531	59.0
1981	354,420	915,590	9,882	62.5
1982	995,820	1,912,360	12,408	71.0
1983	1,857,590	3,882,930	16,330	82.5
1984	3,198,610	7,055,600	20,616	96.8
1985	3,264,090	9,994,200	24,008	111.4
1986	3,586,960	12,957,070	26,355	133.3
1987	4,121,550	16,800,580	29,230	152.1
1988	4,562,700	20,461,420	32,220	174.7
1989	4,709,020	23,397,470	35,300	196.5
1990	4,998,200	25,291,500	38,400	220.8

*Dollar values merge PC retail sales with multiuser manufacturer revenue.

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LARGE-SCALE COMPUTER MARKET -- U.S.-BASED MANUFACTURERS
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	Number of Systems Shipped	Cumulative Number in Use	$ Million Value Shipped	$ Billion Value in Use
		WORLDWIDE		
1980	2,380	14,170	7,880	60.3
1981	1,510	14,430	6,150	61.8
1982	2,300	15,170	11,140	68.3
1983	3,390	16,760	14,460	78.8
1984	3,750	18,490	16,100	89.1
1985	3,240	19,800	16,970	97.2
1986	3,260	21,600	17,560	106.9
1987	3,380	23,600	18,340	116.2
1988	3,530	25,600	19,360	127.6
1989	3,780	27,800	20,520	139.2
1990	4,000	30,000	21,900	151.0
		UNITED STATES		
1980	1,320	7,880	4,800	34.2
1981	890	8,290	3,890	36.3
1982	1,480	8,790	6,810	41.1
1983	1,850	9,490	8,150	46.3
1984	2,240	10,570	8,990	52.3
1985	1,650	11,300	9,290	57.1
1986	1,600	12,300	9,380	62.1
1987	1,630	13,400	9,610	66.9
1988	1,730	14,500	10,000	73.1
1989	1,860	15,700	10,500	79.3
1990	2,000	16,900	11,100	84.9
		INTERNATIONAL		
1980	1,060	6,290	3,080	26.1
1981	620	6,140	2,260	25.5
1982	820	6,380	4,330	27.2
1983	1,540	7,270	6,310	32.5
1984	1,510	7,920	7,110	36.8
1985	1,590	8,500	7,680	40.1
1986	1,660	9,300	8,180	44.8
1987	1,750	10,200	8,730	49.3
1988	1,800	11,100	9,360	54.5
1989	1,920	12,100	10,020	59.9
1990	2,000	13,100	10,800	66.1

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MEDIUM-SCALE COMPUTER MARKET -- U.S.-BASED MANUFACTURERS
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	Number of Systems Shipped	Cumulative Number in Use	$ Million Value Shipped	$ Billion Value in Use
		WORLDWIDE		
1980	16,100	57,600	7,300	34.9
1981	19,200	67,800	9,160	38.9
1982	24,100	87,400	9,100	45.1
1983	28,000	111,600	9,530	49.7
1984	38,650	148,600	13,400	57.9
1985	39,650	180,000	14,610	66.2
1986	44,900	209,800	15,750	76.4
1987	49,900	246,600	17,500	87.2
1988	56,000	288,300	19,600	101.1
1989	63,000	334,900	21,850	115.1
1990	68,900	385,600	24,000	130.7
		UNITED STATES		
1980	9,300	32,100	4,500	17.2
1981	11,100	39,000	5,700	21.1
1982	14,100	50,500	5,600	24.5
1983	16,500	65,700	5,800	28.2
1984	23,950	87,900	8,300	33.3
1985	24,650	108,400	8,760	38.1
1986	26,900	128,600	9,250	43.5
1987	29,100	150,400	10,150	50.7
1988	33,000	175,200	11,400	58.9
1989	37,500	203,300	12,650	67.8
1990	41,500	234,400	13,800	77.1
		INTERNATIONAL		
1980	6,800	25,500	2,800	17.7
1981	8,100	28,800	3,460	17.8
1982	10,000	36,900	3,500	20.6
1983	11,500	45,900	3,730	21.5
1984	14,700	60,700	5,100	24.6
1985	15,000	71,600	5,850	28.1
1986	18,000	81,200	6,500	32.9
1987	20,800	96,200	7,350	36.5
1988	23,000	113,100	8,200	42.2
1989	25,500	131,600	9,200	47.3
1990	27,400	151,200	10,200	53.6

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SMALL-SCALE COMPUTER MARKET -- U.S.-BASED MANUFACTURERS
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	Number of Systems Shipped	Cumulative Number in Use	$ Million Value Shipped	$ Billion Value in Use
		WORLDWIDE		
1980	197,800	858,800	7,700	34.1
1981	212,500	1,042,780	8,800	40.8
1982	248,300	1,296,160	9,100	49.2
1983	282,390	1,542,970	9,800	56.9
1984	338,800	1,861,720	11,100	65.9
1985	325,400	2,170,900	12,320	74.8
1986	354,700	2,507,870	13,500	85.0
1987	391,200	2,887,530	14,980	96.9
1988	447,000	3,322,830	16,810	110.6
1989	512,300	3,821,140	18,720	125.0
1990	582,800	4,387,680	20,500	140.4
		UNITED STATES		
1980	122,400	566,500	4,600	20.4
1981	127,800	679,130	5,400	23.9
1982	154,300	829,080	5,700	29.4
1983	188,840	991,210	6,100	34.4
1984	240,400	1,216,740	6,900	40.6
1985	216,900	1,422,800	7,590	46.5
1986	231,400	1,643,300	8,200	52.9
1987	252,200	1,891,350	8,980	60.5
1988	289,100	2,176,610	10,050	69.2
1989	330,700	2,502,370	11,140	78.2
1990	374,000	2,870,480	12,200	88.3
		INTERNATIONAL		
1980	75,400	292,300	3,100	13.7
1981	84,700	363,650	3,400	16.9
1982	94,000	467,080	3,400	19.8
1983	93,550	551,760	3,700	22.5
1984	98,400	644,980	4,200	25.3
1985	108,500	748,100	4,730	28.3
1986	123,300	864,570	5,300	32.1
1987	139,000	996,180	6,000	36.4
1988	157,900	1,146,220	6,760	41.4
1989	181,600	1,318,770	7,580	46.8
1990	208,800	1,517,200	8,300	52.1

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PERSONAL COMPUTER MARKET -- U.S.-Based Manufacturers[a]
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	Number of Systems Shipped	Cumulative Number in Use	$ Million Value Shipped	$ Billion Value in Use
		WORLDWIDE		
1980	486,000	1,058,000	1,642	4.7
1981	905,000	1,958,000	2,707	7.4
1982	3,775,000	5,646,000	5,358	12.5
1983	7,623,000	13,385,000	11,304	23.3
1984	9,670,000	23,028,000	17,168	38.6
1985	8,828,000	31,506,000	19,070	55.1
1986	9,816,000	39,568,000	20,720	76.6
1987	11,130,000	50,034,000	22,650	96.9
1988	12,380,000	58,906,000	25,150	117.2
1989	13,500,000	65,095,000	27,800	134.2
1990	14,560,000	70,304,000	30,100	153.6
		UNITED STATES		
1980	379,000	800,000	1,091	3.2
1981	644,000	1,441,000	1,945	5.1
1982	2,884,000	4,244,000	4,180	9.1
1983	5,872,000	10,107,000	8,714	17.3
1984	6,586,000	16,686,000	12,962	28.5
1985	5,689,000	22,340,000	13,322	40.2
1986	6,372,000	27,566,000	14,345	53.1
1987	7,170,000	34,336,000	15,500	67.0
1988	8,000,000	39,715,000	17,250	80.6
1989	9,000,000	43,160,000	19,300	91.7
1990	9,800,000	46,694,000	21,000	104.6
		INTERNATIONAL		
1980	107,000	258,000	551	1.5
1981	261,000	517,000	762	2.3
1982	891,000	1,402,000	1,178	3.4
1983	1,751,000	3,278,000	2,590	6.0
1984	3,084,000	6,342,000	4,206	10.1
1985	3,139,000	9,166,000	5,748	14.9
1986	3,444,000	12,002,000	6,375	23.5
1987	3,960,000	15,698,000	7,150	29.9
1988	4,380,000	19,191,000	7,900	36.6
1989	4,500,000	21,935,000	8,500	42.5
1990	4,760,000	23,610,000	9,100	49.0

[a] International Manufacturers with U.S.-based sales offices are counted in U.S. totals, but not international.

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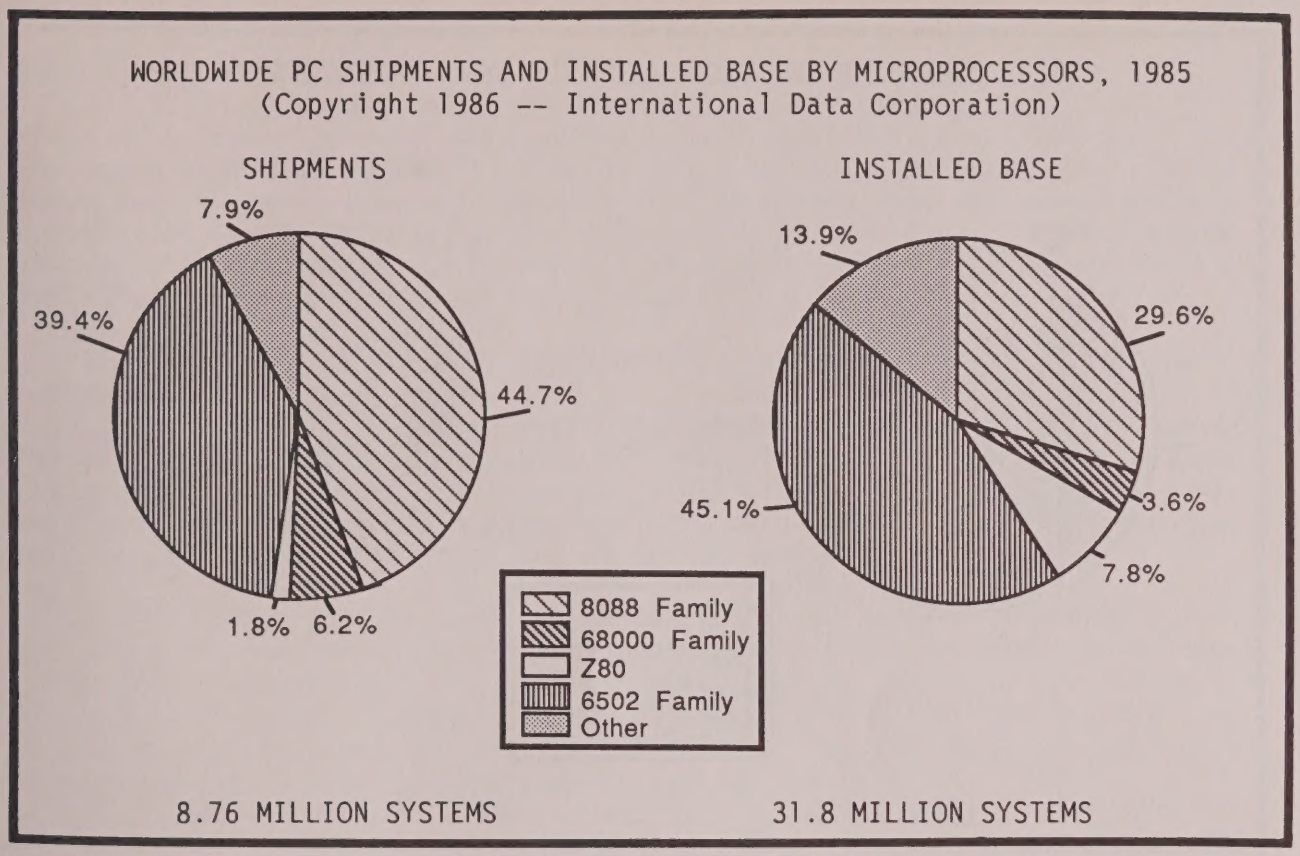

WHERE THE CHIPS HAVE FALLEN: THE PC MARKET BY MICROPROCESSORS

With Comdex and Christmas both looming, PC vendors have been busier than usual in wheeling out new products. Much of the Comdex action revolves around 80386-based systems. For example, Zenith announced that it will be shipping a 386 PC with 40MB and 80MB storage options, while Convergent unveiled for 2Q1987 a 386 NGEN that can run an enhanced version of CTOS offering improved distributed processing and multiprocessing as well as virtual support of MS-DOS.

Other announcements were tailored for the individual consumer. Blue Chip Electronics bowed as the U.S. distributor of IBM-compatible PCs with which the Korean conglomerate Hyundai hopes to replicate what it has achieved with autos in America. Its 8088-based XT-compatible will retail for $699 at mass merchandise outlets like Caldor, Target, and SaveMart, and even, on a trial basis in December, selected Toys-R-Us outlets (although how many users will actually admit that they got their computer at Toys-R-Us?). A Blue Chip/Hyundai AT-compatible was shown at Comdex for 1Q1987 distribution at a comparable discount.

Meanwhile NEC believes that there is still a market for portable PCs. Its $1,995 Multispeed computer (so titled because it can operate at 4.77 or 9.54MHz) is designed to run MS-DOS 3.2, although it uses a proprietary chip to double the potential speed of an 8088-based XT.

NEC's decision to create a chip that could run faster than an Intel 8088 and still run all DOS software written for the IBM PC is exceptional. Most vendors have felt that off-the-shelf microprocessors would both help keep costs down in a very price-sensitive market and assuage potential customers anxious about being able to run those software packages they already own or have heard so much about. Consequently the PC market can be readily divided into a few broad classes based on CPU chips, with the 80386 PCs inaugurating a new group.

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U.S. PC SHIPMENTS AND INSTALLED BASE BY MICROPROCESSORS, 1985
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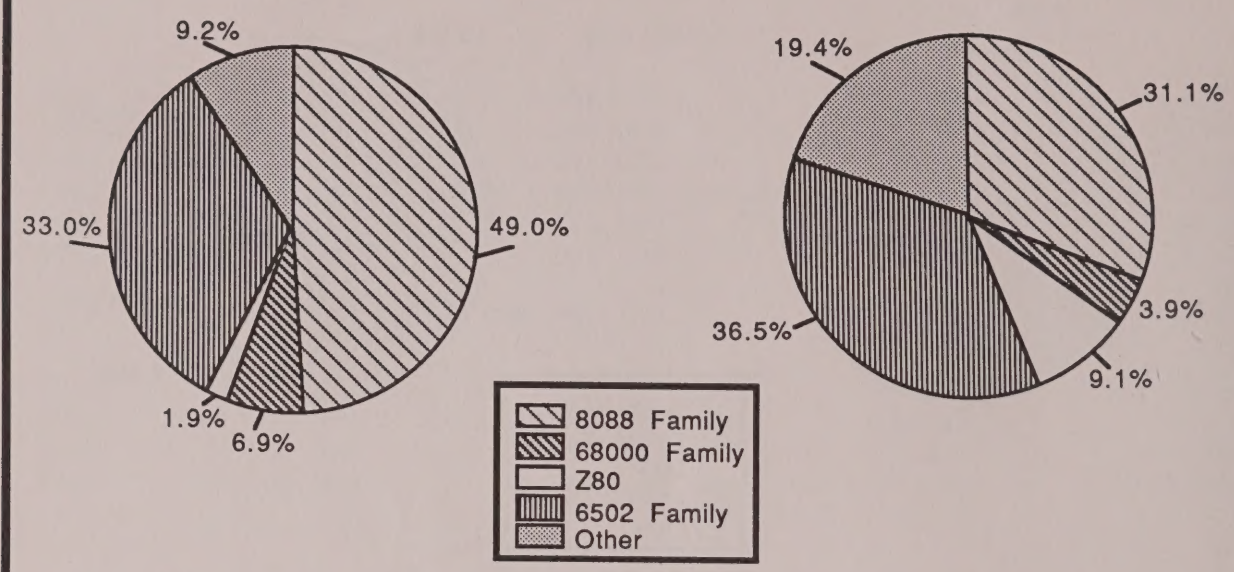

IDC now offers a classification of its PC census by microprocessor. The Intel 8088 family includes all PC-compatibles, whether based on the 8-bit 8088, the 16-bit data path 8086, the 80286 with on-chip memory management for AT-compatibles, and now the 32-bit 80386. The Motorola 68000 family is predominantly found on Unix multiuser systems, but workstations from the likes of Apollo and Sun are also based on 68000s, as is Apple's Macintosh. Zilog, creator of the Z80 family, has never quite recovered from IBM's decision to use Intel chips, and is now concentrating on its 32-bit Z80,000 processor. A number of vendors have produced the venerable 6502 series of chips, crucial because they have powered popular home PCs from Apple, Atari, and Commodore.

The new classification helps to clarify crucial trends in the PC industry:

- o In 1985, the 8088 and 6502 families together accounted for 84% of worldwide PC shipments and 75% of the PC installed base.

- o In the U.S., the success of the IBM standard for compatibility gave 8088-family unit shipments nearly half the market in 1985; internationally Apple and Commodore combined to maintain 6502 dominance.

- o Neither the emergence of the DOS standard nor the decline of the home market kept the 6502 family from maintaining a slight edge over 8088s in the U.S. PC installed base in 1985.

The home market in 1986 should start to see a return to glory with the advent of inexpensive 8088-based PCs, which should therefore encroach even further on the position of the once dominant 6502-based PCs. Meanwhile the turn in the Macintosh's fortunes should help the 68000's market share. Due to the utility of grouping PCs by chips, this categorization will be used extensively in next year's Review and Forecast issues of the Gray Sheet.

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SURVIVAL OF THE FATTEST: THE MAINFRAME SOFTWARE ACQUISITION FEVER

Among PC software vendors, most acquisition/mergers have resulted from a large company's desire to extend its line of offerings and absorb pioneering breakthroughs. The same reasoning holds at the mainframe end, with an added note of desperation as the weak market for large-scale systems and the narrow window of favorable tax status stimulate what is shaping up as the most extensive reorganization yet seen in the software industry.

In particular, as Computer Associates International and MSA gobble up competitors both large and small, they are starting to look more like consortiums than individual corporations. Within the span of a week, Computer Associates struck a deal to acquire Integrated Software Systems Corporation (Issco) and its graphics software for a little under $70 million, and then convinced GE to sell its Software International subsidiary, best known now for its Masterpiece integrated financial software, for an undisclosed amount.

The same day that the Computer Associates/Issco agreement hit the wires, word arrived that MSA had put together a package to acquire Comserv and boost its share of the MRP market (as well as adding HP medium-scale systems to its IBM base). Holders of Comserv common stock get $7 million from the deal, CDC stands to reap $3.5 million for its 20% stake if MSA exercises its option, and Comserv creditors will receive a sum in the vicinity of $16.5 million.

Both MSA and Computer Associates have grown in the 1980s through acquisitions. As recently as this August, MSA bought Information Associates, a DBMS vendor for both IBM and VAX environments, for $15 million; it acquired RTS, an Irish developer of S/3X manufacturing and financial software, in June. Other notable MSA acquisitions in the 1980s have included Q-Pac America, MRP software from Computeristics, Arista, and Distribution Research Association. Less successful was its move into PC software with Peachtree, which it bought in 1981 and finally finished divesting in June of last year.

Meanwhile Computer Associates used acquisitions as its principal means to escape from the IBM DOS ghetto that had fueled its growth from its founding in 1976. Starting in 1982, it went after vendors who had developed expertise in the MVS market like Capex Corporation (1982) and Johnson Systems, Inc. (1984). In 1985 it added Arkay Computers, manufacturer of a DOS-to-MVS conversion product; Value Software, developer of data center management programs for DOS and MVS environments; and CGA Computer's Top Secret product line.

Needless to say, MSA and Computer Associates have not been alone in their zeal to expand horizontally by buying out other software companies. Pansophic acquired SPSS, a statistical software developer, the same week as the MSA/Comserv and Computer Associates/Issco announcements, while Issco itself had bought a controlling interest in a Swedish DBMS company earlier this year.

Current market and financial conditions, though, are fostering consolidation around the handful of really strong contenders. Computer Associates, for example, had a profit of $22.85 million for the 12 months ending September 30, while Issco's net income fell 54% over the first three quarters of 1986, to $1.1 million. MSA's net of $6 million to date in 1986 is not so dramatic as Computer Associates' gains, but it sure beats the company's loss of $3 million over the same period last year. More to the point, it beats a lot of the competition. To the 1986 winners are going the spoils -- to wit, the 1986 losers.

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• FRAYED TRUCE IN THE CHIP WAR. Perhaps U.S. and Japanese negotiators had hoped that the unenforceability by either government of key provisions of the semiconductor agreement signed July 31 could paper over differences with good will. Alas, this is not the season for good will, no matter what the calendar says. After rising above the 1.0 mark through the first half of 1986, the book-to-bill ratio as computed by the SIA has been stuck beneath the break-even point ever since. The preliminary index for October is .98.

In that context, U.S. chip producers have demanded that the Japanese government fulfill its pledge to prevent Japanese semiconductor manufacturers from "dumping" in non-U.S. overseas markets. Washington has reportedly complied with a warning that the trade pact will be abrogated unless by early December Japanese producers stop selling below "fair market value" in other countries. The Japanese government, however, has no more legal leverage to establish overseas prices than the U.S. government. Although Japanese companies may be more vulnerable to "jawboning" than their American counterparts, the U.S. obviously feels that only threats of full-scale retaliation have any chance of success. If so, the presence of so many other gray areas in the agreement suggests that this truce is going to resemble John Foster Dulles's brinkmanship.

• NON-DOS MICROSOFT MOVES. A new version of Microsoft Word for the Mac has been announced that according to Bill Gates is "the fastest word processor ever on a personal computer." Also, Phoenix Technologies will develop its 80386 virtual environment for Microsoft's Xenix V/386 and MS-DOS 3.2.

• PYRAMID AT THE ALAMO. After Pyramid's $1.7 million loss for the fiscal year, E. David Crockett is out as CEO. His replacement is Richard H. Lussier.

o WORKSTATIONS FROM CDC, HARRIS. Bowing at Autofact were engineering workstations from two new entrants. CDC's CYBER 910-300 is designed to run with the company's ICEM CAD/CAM software, although the port to Unix won't be ready until mid-1987. In conjunction with two workstations allegedly operating at an industry-leading speed of up to 3.6 MIPS, Harris is offering an 8-MIPS Unix-based compute server and a new version of HarrisCAD.

• COMDISCO GROWTH. The full United States Tax Court has finished reviewing Judge William Fay's ruling in Aditya B. Mukerji, et al. v. Commissioner and held that purchasers in Comdisco's sale-leaseback transactions are entitled to all benefits for tax purposes as owners of the equipment. The new tax law, of course, repeals the Investment Tax Credit (ITC) on which many of those benefits have been predicated. However, Comdisco has issued a memorandum to its stockholders arguing that it will not be hurt by the new law, as it can simply pass along charges through higher lease rates. Comdisco's position is that the only leasing companies that will suffer will be its weaker competitors.

Meanwhile, the quarterly financials for Comdisco, the only company in the group that the Gray Sheet has been following in 1986 whose results could not be tabulated in the last issue, have arrived. Its $225.3 million in revenue represented a 38.7% rise over 3Q 1985, and nudged overall quarterly growth for the sample from 7.5% to 7.7%. Its 3Q net earnings of $19.1 million meant 28.4% growth. Over the first three quarters of 1986, the addition of Comdisco raises the overall revenue growth from 7.0% to 7.3%.

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THE GRAY SHEET
Computer Industry REPORT

D.C.BELLOMY, EDITOR October 31, 1986 • VOL.22, NO.12 P.J.MCGOVERN, PUBLISHER

IBM'S AUTUMNAL HAZE: SIGNS OF EMERGING INDUSTRY REBOUND BLURRED BY BIG BLUE'S CONTINUING WEAKNESS

Amid the vertiginous vicissitudes of the four decades since the end of World War II, two verities have seemed graven in stone: IBM revenue growth and profit margins would glisten, or at least outperform the rest of the industry; and if the Red Sox made it to the World Series, they would lose in seven games. This October threatened both certainties, but by the end of the month believers in tradition could console themselves (however scant comfort it may be for IBM stockholders or Boston fans) that one out of two ain't bad.

IBM dropped the bad news on October 13, when it announced its financial results for the third quarter. Gross revenue was up only 1.8%; hardware sales actually fell .7% from 3Q1985. Earnings before taxes plummeted 28%, and net earnings kept the downward pace at -27%. Apparently the key factor in the quarter's poor showing was the first indication that international sales, hitherto the savior of IBM's bottom line, have "begun to moderate."

Another index of IBM's current weakness is the contrast with the other companies whose financial results the Gray Sheet has been tracking (see inside). For companies reporting their results by October 31, IBM represented 40% of the quarter's total revenue, while a year ago it could claim 42% of the pie. The revenue pie as a whole grew 7.5%, but without IBM it would have expanded 11.6%.

After three quarters, IBM is up only 4.3% in gross revenue over the first nine months of 1985. Hardware sales are up only 2%, and the net is off 12.3%. With only three months to go in 1986, the fact that the third quarter was comparatively the weakest so far in a slack year virtually guarantees a second consecutive down year in earnings, and raises the very real specter of a down year in revenue. This quarter IBM would have to accumulate at least 92% of its extraordinary 4Q1985 gross of $17.2 billion (40% better than it has done in any quarter of 1986) to better last year's $50.1 billion in revenue.

Two new IDC surveys suggest that the odds are against IBM's repeating its yearend blitz on that scale, and that 1987 may not offer much respite:

- Fewer U.S. IBM mainframe sites now expect to acquire additional systems over the next six months than back in June.
- With weak demand for 3090-150s and 180s and moderate growth for 200s sapping strong 3090-400 sales, IBM's U.S. large-scale revenue growth should be between -3% and +3% through the first quarter of 1987.
- Almost two-thirds of users surveyed expect their information processing budgets to grow less than 6% in 1987.

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IBM Mainframe Markets Buying Intentions Survey

IDC's Market Analysis and Statistics (MAST) Group is inaugurating a quarterly survey of U.S. IBM mainframe sites. A user panel of 500 sites will be telephoned every three months to determine buying intentions over the ensuing half year for additional large-scale and 4381 mainframes, storage devices (disk and tape), terminals, printers, and DBMS and MRP software programs. Gray Sheet readers interested in more information about what promises to be an invaluable gauge of this critical market are encouraged to contact Ken McPherson of IDC.

In late September IDC conducted a trial run of 251 sites for most questions, but of 326 for those dealing with mainframe acquisitions. This initial run of the Buying Intentions Survey therefore maps well for purposes of comparison in critical areas against the Sierra survey of 500 IBM sites that MAST conducted back in June (see the Gray Sheet, Vol. 22, No. 6, July 23, 1986).

Methodological considerations are not relevant to one of the most striking contrasts between the two surveys. Back in June, 16% of respondents planned acquisitions, while another 9% might acquire new mainframes, for a total potential market of 25% of the survey base. In September, 13% planned acquisitions, while with the addition of the "maybes" the potential market grew to only 18% of the base. But the most important question remains what they are considering acquiring. The results for IBM from the Buying Intentions Survey are mixed.

The encouraging news for IBM is that users expect a historically respectable growth in processing power from the earlier survey (around 8% more MIPS for the October 1986-March 1987 time frame than anticipated for the July-December 1986 period). The discouraging news is that right now IBM needs more.

Speaking fiscally, IBM should be happy with the prospects for 3090-400 acquisitions. Projected to the total U.S. market, survey data indicate that some 145 400s will be shipped during the period to the installed base, with another 128 in the "maybe" column. The tall Sierras account for 19% of planned large-scale acquisitions through 1Q1987, and 31% of the "maybes."

The availability of the 400 seems to be having an adverse effect on planned acquisitions of 3090-200s. Respondents indicated that they intended to acquire about the same number of 200s as 400s over the next six months, with only around another 20 as "maybe" acquisitions. If so, given the size of the installed base of 200s in the Buying Intentions user panel, it now appears that U.S. shipments of 3090-200s in 1986 could fall a little short of the minimum figure of 405 projected from the June Survey.

The biggest change since June involves the 3090-150s and 180s. The Buying Intentions panel suggests that only 18% of the large-scale systems acquisitions planned by IBM mainframe sites through 1Q1987 will be uniprocessor Sierras. Even with the "maybes" thrown in, the unit totals would be well under 200 in that time period. Coupled with the 100 or so U.S. 3090-150/180 acquisitions by the IBM installed base through September, these plans suggest that users have considerably tempered their views about the new uniprocessors since June, when 450-520 U.S. shipments in 1986 were indicated by the Sierra survey.

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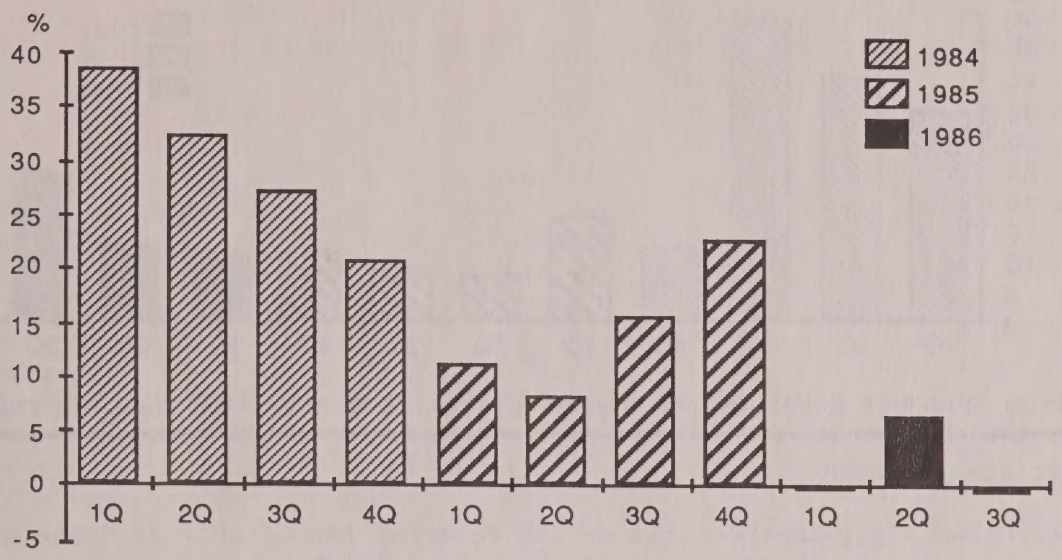
GROWTH OF IBM HARDWARE SALES BY QUARTER FROM PREVIOUS YEAR, 1Q1984-3Q1986*



*From "Sales" column of IBM's quarterly financial reports.

The 3083 installed base, the most likely market for 3090-150/180s, is not just sitting tight -- it is actively considering 3081s, which will comprise around a third of all IBM mainframes acquired through 1Q1987. Almost half of the approximately 250 3081s projected from the survey to be acquired over the next six months will go to shops with 3083s as the senior system; of the 100+ possible 3081 acquisitions, over 80% would be to the 3083 base.

Although the Buying Intentions Survey does not ask its user panel the source of acquisitions, it seems likely that many of these 3081s would be used systems acquired from third-party lessors. In any case, the interest within the 3083 base in migrating to 3081s rather than 3090 uniprocessors indicates that many users do not yet feel an incentive to join the trek up the Sierras. IBM's sole solace may be that 3083 sites are more uncertain about their plans than any other segment of the large-scale installed base.

This suggests a necessary caveat about the Buying Intentions Survey as a guide to IBM's prospects over this quarter and next: it only tells what U.S. users expect to happen, not what will actually occur after IBM sales personnel make their final pitches. Some of those 3081s could yet become 3090-150/180s, while a portion of the 70 or so 3090-200s planned to be acquired by current 200 or 3084 sites might graduate to 400s. IBM has room for leverage with all those "maybes," and with the timing of sales (it will probably go all-out to pack as many as possible of the six-month projected acquisitions into the remainder of 1986 to prevent a down year in revenue). And there are still the international market if it doesn't "moderate" too much, and new U.S. business.

Nevertheless, the survey underscores the difficulties of IBM's task. While the supply of 3090-400s has stimulated a higher demand for 400s than existed in June, price cuts and upgrades from 200s, as well as lower interest in 150/180s, mean that IBM can't just wait for 3090-400 revenue to drop in its lap. It will have to run just as hard as it did in 4Q1985 to keep from falling behind.

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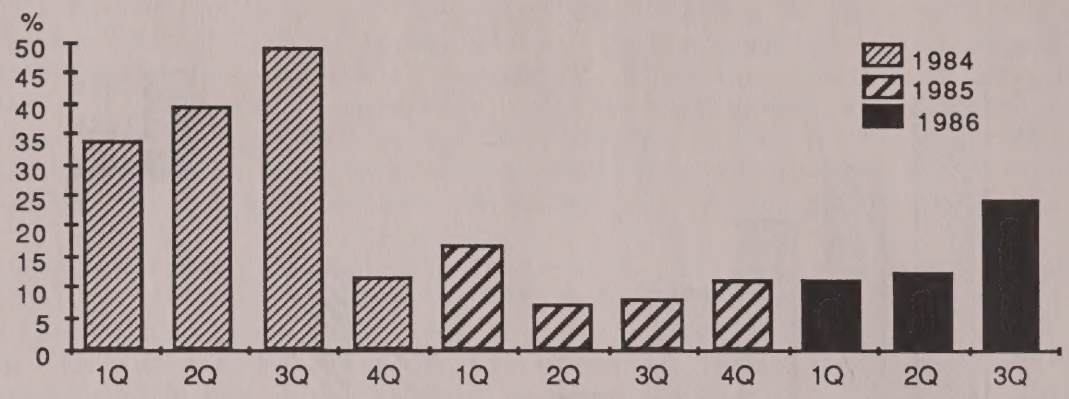
GROWTH OF DIGITAL HARDWARE SALES BY QUARTER FROM PREVIOUS YEAR, 1Q1984-3Q1986*



*From "Product Revenues" column of Digital's quarterly financial reports.

At Last Some Movement

Ken Olsen's gap-toothed grin on the cover of the October 27 issue of Fortune beneath the words "America's Most Successful Entrepreneur" is a visual aid for Digital's 3Q financial report: total revenue up 25.5% for the quarter to over $2 billion, with the growth evenly spread between product and service/other revenues; pretax income more than tripled over the same period last year; net income up 152.5% for the quarter, and 123.7% for the calendar year to date.

However, Digital's success right now is not as exceptional as it seemed as recently as the second quarter. With all but one (Comdisco) of the 45 companies whose financial results the Gray Sheet has been tracking this year reporting their results for the most recent quarter, the overall track record for revenue growth is admittedly a little below the pace of 2Q1986 -- up 7.5% compared to up 8.5% for the same vendors in the second quarter. However, IBM's current poor performance is dragging the whole sample down. Without IBM and Comdisco in the second quarter, growth for the the sample would have averaged out at 9.4%; without IBM in the third quarter, a much healthier rate of 11.6%.

Most of the high-flyers of 1986 are still maintaining altitude (Cray, Sun, Stratus, et al.), although one worrisome note for Compaq is that its revenue growth rate has slipped each quarter (from 48.4% to 23.8% to 11.8%). Apple meanwhile has built impressively on the revenue gains registered in the second quarter, while Apollo has finally begun to reap the benefits of its new line of workstations (note, though, that as impressive as its gains in revenue and earnings were in the third quarter, Sun still managed to keep pace).

Even Data General showed revenue strength this quarter, and would have posted a decent profit if it hadn't paid nearly $31 million to Fairchild Semiconductor to settle litigation. Coupled with the continuing growth of other vendors like Digital, Prime, NCR, Stratus, and Tandem, DG's resurgence bolsters the impression that non-IBM midscale systems are helping to anchor the computer market; only Wang seems to be faltering at the moment.

Bunch results require a couple of footnotes. Honeywell's growth still excludes computers, for which operating profit is "down sharply." And the Burroughs/Sperry merger will play havoc with year-to-year comparisons. For the third quarter, for instance, part of Sperry revenue and income is in limbo.

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SELECTED INFORMATION INDUSTRY FINANCIAL RESULTS, THIRD QUARTER 1986
(Source: Company Financial Reports)

Company	3Q 1986 Revenue $M	3Q 1985 Revenue $M	% Change	3Q 1986 Earnings $M	3Q 1985 Earnings $M	% Change
Altos	32.6	31.7	+2.8	1.3	2.3	-43.5
Amdahl	220.0	221.1	-.5	7.1	5.7	+24.6
Apollo	100.4	55.2	+81.8	2.5	(18.5)	-
Apple	510.8	409.7	+24.7	32.9	22.4	+47.1
Ask Computer Sys	20.3	12.8	+59.2	1.8	.7	+155.8
ADP	321.1	271.2	+18.4	22.7	18.6	+22.0
Britton Lee	7.8	7.1	+10.4	.1	.4	-68.3
Burroughs*	2,633.0	1,159.1	+127.2	52.9	32.2	+64.3
Cipher Data	44.8	35.2	+27.2	1.0	.7	+56.8
Compaq	147.2	131.7	+11.8	8.7	6.3	+38.7
CCI	34.0	25.4	+34.0	1.6	(4.2)	-
Computervision	125.9	105.8	+19.1	1.2	(20.7)	-
CDC w/o ComCrdt	818.5	894.5	-8.5	(19.3)	(237.1)	-
Convergent Tech	64.7	117.4	-44.9	(25.7)	3.9	-
Cray	136.6	99.5	+37.3	26.1	19.1	+36.8
Data General*	330.1	299.5	+10.2	(26.3)	.5	-
Digital	2,038.5	1,623.9	+25.5	182.6	72.3	+152.5
Gould	227.4	230.1	-1.2	4.3	16.0	-73.1
Honeywell	1,664.9	1,569.2	+6.1	32.4	55.7	-41.8
Intel	324.1	311.7	+4.0	(114.2)	(3.6)	-
Intergraph	151.0	131.4	+14.9	15.5	18.0	-14.0
IBM	11,910.0	11,698.0	+1.8	1,077.0	1,474.0	-27.0
Lotus	65.6	49.7	+31.8	9.5	6.4	+49.8
MSA	38.8	30.9	+25.4	.3	(3.5)	-
Mentor	45.0	34.3	+31.3	2.9	1.4	+104.5
Microsoft	66.8	35.2	+90.0	15.8	6.2	+156.5
Miniscribe	47.9	28.5	+69.0	6.1	.3	+1749.8
National Semi	501.1	408.8	+22.6	(1.4)	(6.7)	-
NBI	72.1	70.0	+3.1	(.9)	.7	-
NCR	1,176.9	1,037.6	+13.4	73.4	71.7	+2.3
Priam	27.3	30.3	-10.0	(4.8)	.3	-
Prime	221.9	196.7	+12.8	12.1	15.2	-20.6
Seagate	189.0	90.3	+109.3	24.5	1.7	+1357.1
Sperry*	-	1,303.8	-	-	(187.9)	-
StorageTek	178.5	170.2	+4.9	9.1	(14.0)	-
Stratus	32.1	21.1	+52.0	3.5	2.3	+55.2
Sun	91.6	33.7	+172.6	6.7	1.0	+570.0
Tandem	220.6	173.8	+26.9	21.6	11.1	+94.2
Tandy	742.6	650.8	+14.1	43.7	41.7	+4.8
TI	1,248.9	1,191.2	+4.8	14.0	(82.8)	-
Ungermann-Bass	29.8	19.0	+56.5	1.2	1.3	-11.9
Wang	597.9	560.9	+6.6	(30.0)	7.0	-
Wyse	59.7	38.9	+53.5	4.3	3.2	+33.1
Xerox	2,316.0	2,108.0	+9.9	112.0	(15.0)	-
Sample Total*	29,833.8	27,752.9	+7.5	1,609.8	1,326.3	+21.4

*Burroughs 3Q1986 revenue and income incorporate 51% of Sperry's for July and August, and 100% for September; for Data General 3Q net income includes a charge of $30.9M in settlement of litigation with Fairchild Semiconductor Corp.

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SELECTED INFORMATION INDUSTRY FINANCIAL RESULTS, FIRST THREE QUARTERS 1986
(Source: Company Financial Reports)

Company	1-3Q 1986 Revenue $M	1-3Q 1985 Revenue $M	% Change	1-3Q 1986 Earnings $M	1-3Q 1985 Earnings $M	% Change
Altos*	99.1	96.2	+3.0	5.2	7.2	-28.5
Amdahl	629.6	604.8	+4.1	12.2	15.0	-18.4
Apollo	270.8	224.9	+20.4	4.1	(2.2)	-
Apple	1,368.0	1,220.0	+12.1	97.0	15.1	+541.6
Ask Computer Sys	64.5	52.7	+22.4	5.1	4.8	+6.9
ADP	963.9	811.8	+18.7	85.5	70.7	+20.8
Britton Lee	22.5	21.7	+3.7	.1	2.5	-97.6
Burroughs*	5,106.6	3,557.4	+43.5	145.1	132.9	+9.2
Cipher Data	135.6	115.6	+17.3	6.6	6.9	-5.1
Compaq	438.4	347.6	+26.1	26.7	16.6	+60.7
CCI	88.3	86.4	+2.1	(4.9)	(14.3)	-
Computervision	358.2	323.9	+10.6	(9.2)	(59.0)	-
CDC w/o ComCrdt	2,443.1	2,698.3	-9.5	(82.2)	(295.2)	-
Convergent Tech	228.4	340.5	-32.9	(28.4)	7.0	-
Cray	458.5	295.4	+55.2	101.5	63.6	+59.6
Data General	974.2	905.2	+7.6	(30.1)	1.3	-
Digital	6,142.4	5,166.9	+18.9	591.6	264.5	+123.7
Gould	681.4	690.0	-1.2	(106.4)	(110.6)	-
Honeywell	4,897.3	4,596.5	+6.5	94.7	154.4	-38.7
Intel	909.4	1,047.0	-13.1	(156.7)	16.5	-
Intergraph	448.4	370.9	+20.9	50.8	49.1	+3.6
IBM	34,305.0	32,901.0	+4.3	3,399.0	3,874.0	-12.3
Lotus	201.0	153.7	+30.8	32.7	26.7	+22.4
MSA	115.8	94.0	+23.1	5.8	(3.2)	-
Mentor	124.2	100.1	+24.1	7.1	6.3	+11.6
Microsoft	179.2	112.7	+59.0	38.0	20.3	+87.2
Miniscribe	132.0	78.3	+68.5	16.4	(19.2)	-
National Semi	1,227.8	1,231.9	-.3	(40.5)	(7.9)	-
NBI	213.3	189.5	+12.5	(6.0)	7.6	-
NCR	3,306.5	2,911.9	+13.6	202.5	182.0	+11.3
Priam	91.9	84.4	+9.0	(6.8)	(11.7)	-
Prime	629.2	559.8	+12.4	32.8	40.3	-18.7
Seagate	457.5	202.6	+125.9	52.7	4.1	+1190.2
Sperry*	3,056.5	4,124.4	-25.9	122.1	(30.5)	-
StorageTek	511.7	504.8	+1.4	27.9	(59.7)	-
Stratus	89.2	54.9	+62.5	9.8	5.7	+73.4
Sun	225.8	104.9	+115.3	16.0	6.3	+152.6
Tandem	597.7	464.5	+28.7	52.1	20.3	+156.2
Tandy*	2,126.8	1,857.8	+14.5	112.6	116.8	-3.6
TI	3,638.3	3,715.7	-2.1	2.5	(77.6)	-
Ungermann-Bass	78.6	49.6	+58.3	(1.9)	2.1	-
Wang	1,973.0	1,748.8	+12.8	(7.8)	(84.6)	-
Wyse	158.6	111.1	+42.7	12.0	7.0	+71.4
Xerox	6,632.0	6,165.0	+7.6	335.0	319.0	+5.0
Sample Total*	86,800.2	81,095.1	+7.0	5,222.3	4,690.9	+11.3

*Altos excluding 1Q gain from sale of investment in affiliated company; 1986 totals are undercounted by half of two months' Sperry revenue and income; Tandy revenue restated to reflect spinoff of foreign retail operations.

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Executive Conference Opinion Poll

During the last week of October, IDC offered shelter from the desert sun to 160 executives, predominantly MIS managers from government and the commercial sector, at an oasis called Palm Springs. Never passing up an opportunity to run another survey, IDC conducted an official "Executive Conference Opinion Poll" to determine participants' views on pressing management issues.

The most surprising result of the poll was the respondents' pessimism about their information processing budgets for 1987:

- Fully 28% expect their 1987 expenditures to be at best even with, or below, the 1986 figure.
- Another 36% expect growth, but under 6% -- which makes 6% growth the budget ceiling for 64% of respondents.
- Of the 30% who anticipate higher growth, over two thirds don't expect it to exceed 10%.

These prognostications emanate from a class of individuals who have traditionally expected more than top management has eventually signed off on.

The value of a survey like this is not its representativeness, but its reflection of the mature judgment of unrepresentative market leaders. Of the respondents, 32% were commercial users, 44% hailed from government agencies, and 14% were on an industry vendor's payroll. The shops supervised were critically important for major players, since 43% of the respondents will have spent more than $25 million apiece on information processing in 1986.

Possible explanations for the flat spending on information processing emerged from responses to other questions in the poll. When asked which factors limited the effective use of their information systems, respondents most often blamed the slow pace of applications development (44% singled this out for its severe impact) and budgetary constraints (a major handicap for 37%). If the applications bottleneck could be alleviated, it is possible that requests for additional equipment and personnel might be treated more favorably.

Perhaps counterintuitively, respondents were not so quick to blame incompatible hardware or software products (a severe problem for 25% and 27% respectively). Nevertheless, hardware/software incompatibility was still a problem at some level for around 90% of respondents. They expect the most help from the implementation of de facto standards like SNA and DECnet, followed by the implementation of real industry standards (although 15% doubt whether they will ever emerge). Whatever IBM and Digital might prefer, only 35% expected that narrowing system suppliers to one or two companies might be a solution.

A final note on buzzwords: the concept of the Chief Information Officer (CIO) as a facilitator of IS strategy functioning between the information processing system and top management has received a lot of press of late. Two thirds of those answering said their organization already has someone answering that description, but only 3% of the "yes" respondents use that title. If they said "CIO" to the head of their company or agency, 39% thought the head honcho would correctly identify the acronym, 8% predicted the boss would think of the labor organization, and 46% anticipated a blank stare.

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• BELL CURVE TO ITALY FOR COMPUTERS. AT&T reshuffled its computer strategy once again by turning over production and direction of its PC line to Olivetti. Olivetti gets a lot from the deal: control over new PC development; exclusive marketing rights for AT&T office telephone, PBX, and computer products in Europe; an extension of the companies' research alliance until 1996; and freedom from worrying about a takeover by AT&T for the rest of the decade (AT&T, which had an option to increase its 23% stake in Olivetti to 40% at the end of 1987, now can't raise its share above 25% until 1990, and can do nothing to replace Olivetti's chairman, Carlo De Benedetti, for ten years).

Replacing James Edwards as senior vice president of AT&T's Computer Systems unit will be Vittorio Cassoni, previously head of Olivetti's U.S. operations. In Cassoni AT&T gets a proven manager who is not bound to any of the sometimes conflicting strategies the company has undertaken to make an imprint on the computer business. Robert Allen, AT&T's president and COO, has already intimated that the Convergent Tech deal, and therefore presumably also the Unix PC, will not survive beyond the end of the year. Also under sharp scrutiny are other arrangements entered into by earlier managers, including the thus far unconsummated OEM deals with Omnicad and Counterpoint.

• FRANCO-AMERICAN-JAPANESE CHIPS. Schlumberger Ltd., the Francophone conglomerate based in New York City that has been hit hard by depressed conditions in the oil industry, has sold operating control of its Fairchild Semiconductor subsidiary to Fujitsu. The Japanese giant, like other Far East manufacturers facing a falling yen and rising American protectionism, was already exploring moving more production to the U.S. It will now have semiconductor plants in place unless U.S. chip manufacturers can exploit Washington's qualms about future defense needs to persuade the government to block the sale.

• FLOATING POINT SHAKEUP AND SHAKEOUT. After a flurry of atypically bad news (delays on its high-end Series T line, investor lawsuits charging misrepresentation of progress on the system, a decision to cut 12% of the work force, and an operating loss of $3.9 million for the quarter ending July 31), Floating Point Systems reported on October 15 that Lloyd Turner was out as president, CEO, and director, and is now just a Series T consultant. The interim chairman/CEO will be Milton Smith, FPS's long-time chief counsel. It was also announced on October 15 that revenue for the current quarter would not be better than for the last, and that the operating loss would be worse. On October 31, Smith decreed another 17% decrease in employees and salary reductions averaging 10% for the remaining 1,160 workers.

• WHITE KNIGHT CHECKMATED. Televideo's bid to acquire Alpha Micro was squelched when its chairman forced out the directors who sponsored the deal.

• TOLERANT BACKS OFF FROM PUBLIC OFFERING. In the face of the weak market for computer stocks, Tolerant has withdrawn the $10 million public offering it announced in July. Instead it will raise an equivalent sum through licensing fees and prepaid royalties from RC Computer A/S of Denmark and another round of equity financing from its current investors. Tolerant sells the Eternity line of fault-tolerant Unix-based OLTP systems. It claims Eternity as a registered trademark, which might surprise long-suffering Red Sox fans who thought they had first dibs on the concept.

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RUSH TO USERS' JUDGMENT: IBM'S 9370 LINE

The Gray Sheet commiserates. Typographical errors are not unknown in these pages, along with other embarrassing peccadilloes. But IBM's fault-tolerant imagemaking generally prevents anything so human as a misprint from showing up in widely disseminated material, so the appearance of "avialability" in the October 7 press release for the 9370 line can be interpreted as a sign of IBM's haste to get the word out about its new midscale systems.

So, too, were the crossed signals in press leaks during the days before the announcement. The word-of-mouth suggested that the new systems would be Micro-370s, maybe based on the single-chip implementation of 370 architecture (over 100 S/370 instructions, with the rest available through software emulation) announced in February. Anyhow, it seemed reasonable to expect that IBM's new product(s) would be roughly comparable to and competitive with the MicroVAX II.

Well, state-of-the-art IBM technology is involved (1Mb memory chips, integrated I/O controller, etc.), but there is little micro about the 9370 systems:

- The technology is not microprocessor-based but rather 4,000 gate/chip bipolar logic.
- The chief storage options are 8" 9332/9335 (400/800MB) DASD devices plus a new 1/2" tape backup.
- The entry-level system is the size of a two-drawer filing cabinet.
- The current top of the 9370 line is twice as tall and wider, and requires a new air-cooled TCM.

In fact, the best comparison is not, say, to the VAX-on-a-chip MicroVAX II, but to the revamped superminis unveiled by Digital over the course of the year. IBM's performance entry point is lower than for the VAXBI 8XXX systems, but the philosophy is similar: replacing an aging line (in this case, the 4361s) with more up-to-date systems offering better price/performance and more compact packaging (in this case, rack-mounted for customer installation).

Strengthening the comparison with the 8XXX line is the breadth of offerings in the 9370 line, with four systems to date and apparently more to come. The entry-level 9370 offers comparable performance to the old introduction of the S/370 line, but with a price and design tailored to departmental computing; the current high end encroaches on 4381 territory. The 9370s do not make IBM a single-architecture vendor (not as long as the S/36 and S/38 lines also compete for departmental computing), but they do give users the option of distributing S/370 across more environments than ever before.

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THE FIRST FOUR IBM 9370 INFORMATION SYSTEMS

Model	Memory	Est MIPS	I/O Slots	Rack Enclosure	Price	$/Est. MIPS
9373-20	4MB	.5	7	1 meter high	$31,000	$60,000
	8MB	"	"	"	$41,000	$80,000
	16MB	"	"	"	$51,000	$100,000
9375-40	8MB	.5	17	1.6 meter high	$65,000	$130,000
	16MB	"	"	"	$85,000	$170,000
9375-60	8MB	1.3	"	"	$93,000	$70,000
	16MB	"	"	"	$113,000	$85,000
9377-90	8MB	2.6	10	1.6 meter high	$190,000	$75,000
	16MB	"	"	"	$210,000	$80,000

Among the four systems announced on October 7, the entry-level Model 20 is the price/performance leader, but users may find its functionality too limited. It is not upgradable to other 9370s due to the smaller size of the encompassing rack unit. As with other 9370s, DASD and/or tape units are rack-mounted above the processor unit.

Models 40 and 60 seem the most direct replacement for the 4361s, which IBM sought to market for the scientific/engineering market. The 40 is the same processor as the 20 jiggered to run up to 1.4 times as fast in compute-intensive applications. The 60 is rated at 2.4 times a 20 or 40 in commercial environments, and 2.0 to 2.7 times a 40 in compute-intensive. Upgrades from the 40 to the 60 amount to a board swap.

The 9377 Model 90 is the odd man out. Developed at IBM's Boeblingen, Germany facility rather than the Endicott, NY plant whence the other three originated, it houses the processor logic in an air-cooled TCM. The processor is rated at 2.1 times a 9375-60 in commercial, but a bit less in compute-intensive applications. In another gauge, the 9377-90 running VSE CICS is estimated to run 5.1 times as fast as a 9373-20 or 9375-40; running VM/SP CMS for interactive processing, it is estimated at 5.5 times the performance.

Because the different packaging requires a separate I/O unit limited to 10 slots, an I/O adapter allowing the user to buy 10 or 11 more slots is standard, and there is space for two other adapters. The I/O adapter costs $4,200, and the I/O card units $7,700 or $11,300. Upgrading from a 40 or 60 is possible but not trivial (an additional rack is needed, for example).

Price/performance for the new systems depends on how things are measured. The Model 20 is said to offer "better performance than the current entry-level System/370 at about half the price." Presumably this means the 4361-K3. After the most recent price cuts the Model 20 would cost about three-quarters, not half, of the list price for the entry-level 4361 ($39,600), but if you threw in $10,000 for equivalent memory on the 4361-K3 and additional money for items that come standard on the 9370s for the first time (e.g., the console), IBM's comparison seems in the ballpark.

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The MIPS estimates in the table are based on IBM's cross-family comparisons and common industry estimates of performance. However, IBM doesn't accept those MIPS, or the price/performance comparisons with Digital systems that they suggest. It promises detailed performance figures contrasting the 9370 line with comparable systems from Digital, DG, and the like within 30 days.

In a taste of what is to come, IBM has offered 9370 ratings on the Linpack benchmark published by the Argonne National Laboratory. In full precision without the standard multiply/add assist on 9373 and 9375 systems, the 20 comes in at .12 and the 40 at .15 MFLOPS (Argonne rates the MicroVAX II at .13); the 60 is charted at .4 and the 90 at .79 (Argonne puts a DEC 8650 at .7, IBM's 4381-11 at .39, and DG's MV/10000 at .3).

The Linpack benchmarks were performed with 9370 systems running VM/SP, which IBM is positioning as the operating system of choice for the new systems. Initially VM will be the only environment available that will support IX/370, IBM's Token Ring LAN, and (this must have hurt) Ethernet. VSE/SP will also run on all four models, but MVS/SP can only go on the 60 and 90; MIPS-hungry MVS/XA is not supported at this time.

The 9370 line thus brings into the departmental and work area arena operating systems designed for MIS environments. Hence IBM has taken steps to alleviate some of the potential end-user frustration and MIS overload. For example, VM/IS Release 4 is an "integrated software solution" bundling a version of VM/SP that can be administered by individuals with little system support experience together with a choice of eight packages including application software for different uses (engineering/scientific program development support, text/office support, database query, networking support, intelligent workstation support, communication controller support, problem solving languages, and APL language support).

Ostensibly to reduce software charges for smaller S/370 machines like the 9370s, but probably also to firmly establish VM and VSE for the new systems, IBM is introducing a schedule of graduated one-time charges for selected VM and VSE programs. S/370 systems are divided into four pricing groups:

- Group 40 (3090s; 3084s; and 3081s).
- Group 30 (3083s; 3032s; 370/168s and /195s; 4381 Models 2, 3, 12, 13, and 14).
- Group 20 (4381 Models 1 and 11; 4361 Models 4 and 5; 4341 Models 1, 2, 10, 11, and 12; 3031s; 370/155, /158, and /165; and the new 9375 Model 60 and 9377 Model 90).
- Group 10 (9373 Model 20 and 9375 Model 40; 4361 Model 3; 4341 Model 9; 4321s and 4331s; and 370/115, /125, /135, /138, /145, and /148).

Savings will vary. In most cases the Group 40 price is roughly equivalent to the old one-time-charge figure, although in a few cases it is sharply higher. Of the 90 or so eligible programs announced, there is a fairly even division between three- and four-tier pricing. In the former, which includes some significant programs like PROFS, Group 30 and 40 pricing is the same, while for processors in Group 20 it is typically 70% of that figure, and for Group 10, 40%. In the latter, which includes operating systems, the Group 10

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price is usually 25% of the Group 40 figure, Group 20 around 44%, and Group 30 62.5%. There are a few instances of two-tier pricing, with Group 10 pricing 57% of that for Groups 20, 30, and 40, as well as a few other anomalies. Current licensees are allowed to convert to the new graduated one-time option.

This includes users of PCM boxes. IBM has asked the PCM vendors for data to help assign their processors to the proper group, and will publish a list of systems on which it has received material by November 17; PCM users, though, have only until November 21 to take IBM up on the option. Amdahl would not be at a disadvantage, since it has chosen to compete only at the Group 40 level, but NAS could sweat a little if too many of its customers let the tiers go by.

The most significant questions involve the implications of attractive one-time pricing for the steady long-term revenue growth that IBM gets from software leasing. IBM strategists may have decided that recently weak revenue from midscale S/370 hardware would benefit from bargain software, and that the software revenue might be more important in today's troubled fiscal environment than at some point in the future. Note that, unlike the new hardware unveiled on October 7, the graduated software pricing is available immediately.

Even if users pressure IBM to extend graduated pricing beyond VM and VSE, it would still retain considerable leverage. IBM could rely on the three-tier option to keep MVS and MVS/XA programs for Group 30 and 40 systems at the same high one-time charges they now bear. Also, it can pick which programs such an option would apply to. Nevertheless, software revenue is so crucial for IBM's financial future that developments in this area will bear continued scrutiny.

On the other side of the spectrum from immediate availability of graduated pricing is the most disappointing aspect of the announcement: the 9370 systems aren't even scheduled for beta siting until February, with early support installations following in the second quarter. Model 20 and 60 processors are supposed to become generally available in 3Q 1987, but only with "a selected, fixed set of features and Input/Output devices." General availability of Models 40 and 90 is scheduled for the fourth quarter, alongside "changes as appropriate to configuration of installed machines." IBM intimates that the timetable will in all likelihood be accelerated, a la the 3090s, but a midscale announcement four months prior to beta-testing is still jarring.

Although the haste to publicize the 9370s was seemingly due to Digital's recent successes, the 9370s are not "VAXBusters" -- they couldn't be without becoming "Bluebusters." Price/performance couldn't get too aggressive without undercutting 3090s and 4381s, and IBM had to be careful about hurting S/3X prospects. As it is, the new systems will add to the confusion for 36 or 38 users who also rely on an IBM mainframe, since they must choose between S/3X software and PROFS on a 9370 for departmental OA. While IBM can still stress the S/36-38 combo for vertical markets, third-party software, accessibility to nonprogrammers, and cost, 9370 price and packaging allow the migration of S/370 programs like PROFS into a wider variety of environments than ever before.

This is only another way of saying that, even without true distributed processing, the 9370s can play a major role for certain large users. Access to a wide range of CPU power will appeal to major corporate users like United Airlines, which IBM says will install "thousands" of 9370s for its travel agents across the country. The 9370s won't cure IBM's midsystem ills, but they will maybe be able to ease some of the pain.

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BEFORE AND AFTER: 1985 WORLDWIDE MULTIUSER SYSTEM VALUE ACCRUED BY SELECTED VENDORS, ACTUAL AND AS IF MERGED UNDER RECENT AND PROPOSED CONSOLIDATIONS*
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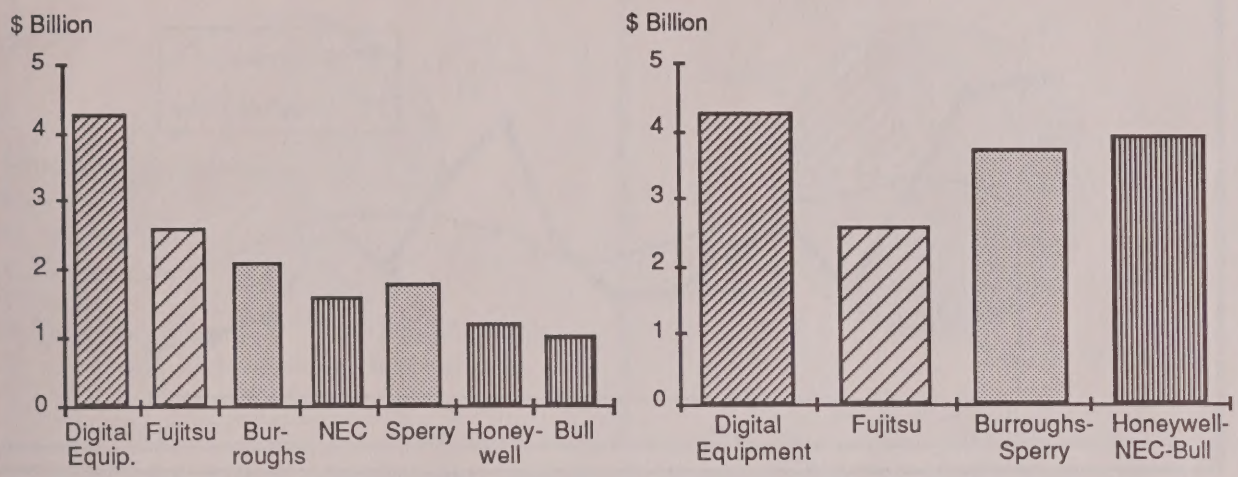

*This is a heuristic exercise presuming that sales would have occurred at the same levels, and that HIS, NEC, and Bull effect a true merger

UNBUNCHING, TAKE TWO? HONEYWELL, NEC, AND BULL EXPLORE THE OPTIONS

On October 10, Honeywell quietly dropped another shoe. Amidst the realignment of top management on the controls side into market-oriented business groups, it has merged the domestic and international operations of Honeywell Information Systems under the former head of U.S. computer operations. Unlike the controls and aerospace/defense groups, which report to Honeywell's president and COO, HIS will be directly under Edson Spencer, the chairman and CEO.

Reorganizations, of course, are a dime a dozen these days, as vendors struggle to find the best match between elusive users and their wares, or at least shake up top management and maybe find a scapegoat. The difference with Honeywell is that the simultaneous consolidation and segregation of its computer business seems to be in preparation for consolidating it in the "entity" Honeywell has announced it "intends to negotiate" with NEC and Groupe Bull.

Presumably two weeks of rumors last month forced Honeywell's hand before it was ready to announce anything. As the wording quoted above indicates, the wording of the September 24 press release was studiously vague and ambiguous. Honeywell "intends to continue involvement in the computer business" in an unspecified manner and degree as a partner of NEC and Groupe Bull, but apparently won't "focus" on computers any longer, for that verb was reserved for its automation/controls and aerospace/defense sectors. It has intimated that it would like to have that "entity" in place by yearend, but has vouchsafed nothing more on what it would mean to Honeywell employees and users.

There is undoubtedly a large measure of anxiety among both groups, but the view at IDC is that the proposed consolidation is if anything overdue. It offers the best prospects for protecting the interests of Honeywell's installed base, and introduces a larger, more viable player on the worldwide computer stage. Unlike the Burroughs-Sperry merger, for example, the three vendors' lines are already close enough to achieve synergy in a relatively short time.

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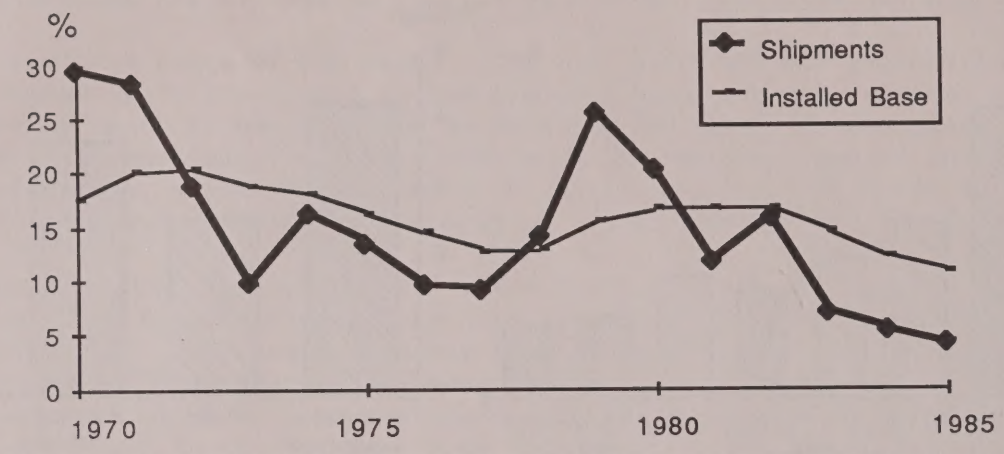
HONEYWELL MARKET SHARE OF U.S.-BASED VENDORS' WORLDWIDE UNIT SHIPMENTS AND INSTALLED BASE OF LARGE- AND MEDIUM-SCALE SYSTEMS, 1970-1975
(Copyright 1986 -- International Data Corporation)



If Honeywell does indeed intend to get out of computer production, that need not mean deserting the commercial computer market. Its sales and service organization would be invaluable to an "entity," and it knows certain niches and nations in that market better than NEC or Bull could hope to. Just as a brand name, Honeywell still has a lot to offer. With Bull and especially NEC as the active partners, the consolidation could bring Honeywell a better return on a minority interest than it now gets from Information Systems.

Figuring in the equation would be the following factors:

- For three consecutive quarters in 1986, Honeywell has had to use identical wording to describe its operating profit from Information Systems: "down sharply."

- From its number two position in the computer industry in the early 1970s, Honeywell slipped to under 2% of the value of worldwide computer shipments by U.S. vendors in 1985, its lowest percentage yet.

- Among all vendors throughout the world, Honeywell accrued about 2% of the value of multiuser shipments in 1985, compared to 3% for NEC and around 1.7% for Bull.

- In 1985 its share of worldwide unit shipments of large- and medium-scale systems by a U.S. vendor also fell to an all-time low of 4.1%.

- However, Honeywell's share of U.S. vendors' worldwide installed base of large- and medium-scale systems, although also at a new low point as of 1985, remains at an alluring 10.7%.

- Moreover, it offers an entry into the crucial U.S. large- and medium-scale market from which foreign vendors like NEC and Bull have been largely excluded except through U.S. companies.

- The U.S. installed base includes some attractive niches (e.g., in large-scale systems, over 20% of the nondefense federal government market, 9% of the health industry, and 6% of durable manufacturing).

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HONEYWELL'S U.S. LARGE- AND MEDIUM-SCALE INSTALLED BASE BY INDUSTRY, 1985
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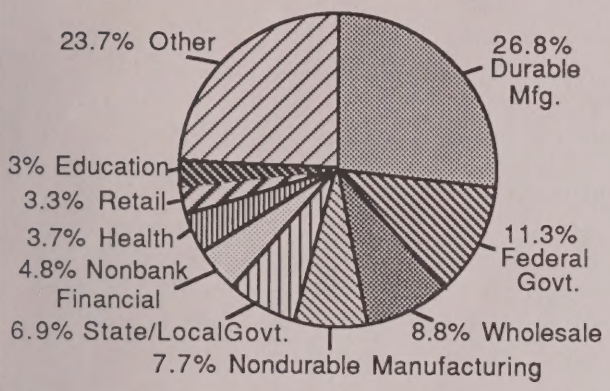
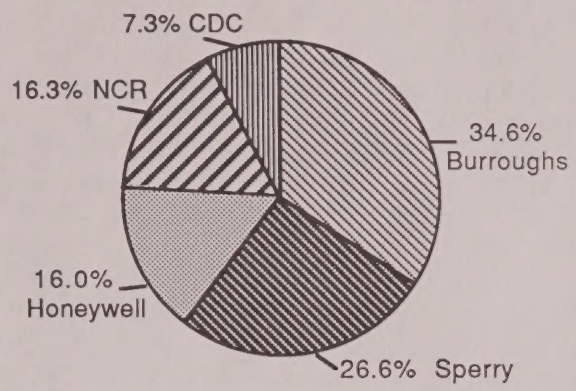


10,890 SYSTEMS

VENDOR SHARES OF THE VALUE OF BUNCH SYSTEM SHIPMENTS, 1985
(Copyright 1986 -- IDC)



$6.9 BILLION

Honeywell's position in the government market gives it added leverage in negotiations with NEC and Bull, since government contracts are especially vulnerable to "Buy American" pressure. Already CDC is citing the foreign technology issue in its bid to overturn an Air Force contract won by Honeywell with NEC mainframes. Honeywell has signaled its intention to stay in this market by publicizing its participation in the Sperry Aerospace/Marine auction.

Nevertheless, Honeywell's weakness as a long-term computer player on its own has long been recognized. Its gains from acquisitions like the GE and Xerox computer lines have proved ephemeral. In recent years it has leaned on the technology of others, particularly NEC, although its large-scale price/performance has not of late been notably attractive until the newly announced second generation of DPS 88 systems. A number of industry watchers have felt that Honeywell would do better to concentrate on controls, not computers.

Two factors seem to have converged to force Honeywell to the same conclusion. One has been the failure of its latest strategy to turn computer sales around by marketing controls and computers in tandem. The other was probably Burroughs' takeover of Sperry, which merged into one giant company the two Bunch vendors with which it was most directly in competition and warned Honeywell's management of the possibility of a hostile takeover if it didn't initiate a friendly pooling of interests in its area of weakness. It couldn't have chosen anyone friendlier than NEC and Bull. It's been living with them for a while; now it has applied for a marriage license.

Still, the negotiations symbolize the passage of time and power. Honeywell used to own a controlling interest in Bull, and divides the European market with it (Britain, Ireland, and Italy to Honeywell, the rest to Bull). The NEC relationship goes back to 1962, when the companies signed an agreement giving NEC access to Honeywell technology. In 1983, a new deal had to be struck after the NEC ACOS 1000 beat out Honeywell's forthcoming DPS 88 for the GEISCO contract. Honeywell now adds software to the NEC machines and markets them as its DPS 90 line. Last year it sold its Japanese subsidiary to NEC, and this year NEC decided to form a joint venture with Honeywell to market its supercomputers in the U.S. Access to the Honeywell name and base, not its technology, is now NEC's primary concern. But neither name nor base is to be sneezed at. If the "entity" is achieved, it will allow Honeywell the most graceful exit possible.

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• SPECTRUM DELAY. The HP 3000 Series 930, commercial pioneer in Hewlett-Packard's new Precision Architecture, has been delayed until midyear 1987, although the engineering-oriented 9000 Model 840 is still slated to ship in December. H-P says that the 930's I/O performance is below expectations, and places the blame on the interface between the I/O, the database, and the operating system (MPE XL rather than HP-UX, the Unix variant that runs on the 840). For 1986, H-P will push the Series 70 midlife kicker in lieu of the 930. For 1987, it will accelerate shipments of the 930 when they become available, which should be about the same time as the advent of the second commercial Precision Architecture system, the 950. At that point H-P will market the 930 as an upgrade from the Series 58, and the 950 as an upgrade from the Series 70. The long-term problem is whether the delay will stimulate many defections, but Hewlett-Packard users have to date proved themselves a very patient lot.

• SPERRY-BURROUGHS' FIRST PRODUCTS. It fell to the Sperry side to introduce the first major products since the merger was finally consummated last month. The 2200/200 line extends Sperry's 1100 series into the office environment, with one-, two-, three-, and four-processor systems based on a six-chip set. Implementing the full 1100 instruction set is not as cheap as emulating some (the entry-level system costs $198,026), but Sperry felt that the nature of its installed base, the target market for the 2200/200s, dictated emphasizing performance over price. New business is the target for Sperry's Unix line, which has received a new entry-level system (NCR's Tower 32/400, whose introduction means that what was known as the Tower 32 becomes the 32/600), two more upper-tier products from CCI, and, probably most importantly for Sperry's midscale strategy, Mapper C, which ports Mapper from 1100 OS to Unix.

• INTEL-IBM MICROPROCESSOR DEAL. In return for Intel receiving the right to market IBM's gate array macrocell library and proprietary packaging through its new ASIC devision, IBM gets the microprocessor and microcontroller macrocells it needs to customize PCs constructed around Intel's 80286 or 80386 chips, thus signaling one IBM strategy to thwart the clones and compatibles.

• ALSO ON TAP FROM IBM. Among other announcements of interest in the October 7 bundle were: (1) A new link protocol converter permitting up to seven 3270 devices to access S/36 or S/38 applications as well as S/370 via a "hot key." At $5,595, that comes to about $800 per user, which is in line with other recent IBM workstation announcements. (2) The 9347 1/2" streaming tape drive (1,600 bpi, 40/160KB per second) designed for rackmounting on 9370 processors. (3) Some tinkering with S/36 programs -- DisplayWrite/36 for customizing system profile options, Personal Services/36 for greater consistency with other PS products. (4) SolutionPacs bundling software and support for specific applications, both vertical (branch and integrated banking, retail, plant automation/material tracking, educational) and generic (expert systems development, software engineering, and LAN implementation). (5) A Corporate Service Amendment, effectively replacing the Enterprise Maintenance Agreement (which was never formally in place). The new program involves maintenance reductions on systems and networks for qualifying users and eligible machines (amounts varying for machine types and one- or three-year options). To qualify, users must demonstrate "effective systems management control procedures" in an on-site assessment by IBM. The visit costs $3,500 per location for systems, $8,000 for networks.

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THE GRAY SHEET
Computer Industry
REPORT

D.C.BELLOMY, EDITOR Sept. 30, 1986 • VOL.22, NO.10 P.J.MCGOVERN, PUBLISHER

REVOLUTION AS EVOLUTION, AND VICE-VERSA: COMPAQ'S 80386-BASED PC

Morning in a New York nightclub amid green lasers, quotations from everybody from Plato to Blake to Herbert Spencer, and Neil Diamond singing "Heading for the Future." Ben Rosen intoning, "Today, September 9, begins the golden age of the personal computer," and invoking the day when our children will turn to us and ask, "Mommy, Daddy, why do we celebrate September 9?" And the Deskpro 386 literally descending from the heavens in a swirl of light.

On the other hand, Rod Canion carefully wrapping the product in a security blanket of public endorsements from Bill Gates of Microsoft, Gordon Moore of Intel, Ed Esber of Ashton-Tate, and Jim Manzi of Lotus, to reassure users that the Deskpro 386 revolution is really just the next step in the evolution of the Intel/DOS standard, and then justifying the decision "to move ahead of IBM to the next generation of the industry standard" as not really that risky.

Compaq's awesome rise to prominence (third-year sales of $504 million, the fastest rise to the Fortune 500 in the third of a century that benchmark has existed, etc.) has depended on two kinds of expertise: technological, and marketing. Both were on display on September 9, especially the latter.

Compaq portrays as a herculean task its 11-month effort to insure that its 80386 PC would be both state-of-the-art and fully compatible with the existing software base. This is marketing as well, to dissuade competitors from a comparable investment, but there is no reason to doubt Compaq on the difficulties it confronted. The decision to be the first major vendor with a 386-based PC derived from corporate strategy, but its implementation depended on the skills in IBM-compatibility of engineers who have served Compaq so well in the past.

Nevertheless, the tricky part is the balance of marketing imperatives, as Compaq must convince distributors and customers to jump on the newest-biggest-and-best bandwagon without waiting for IBM to climb into the driver's seat. It has to portray the 386 as an oxymoron -- a fail-safe revolution.

For example, the 386 is engineered internally to take advantage of the 80386 (32-bit system bus, standard expanded memory manager to extend DOS up to 8MB in accord with the Lotus/Intel/Microsoft Expanded Memory Specification, up to 10MB of static column RAM on the system memory board, choices of 40MB or 130MB storage). However, the external bus is still the 16-bit AT standard.

In other words, the Deskpro 386 is designed as an add-on PC to fulfill specific high-performance tasks. The key claim is that it will run industry-standard software two to three times faster than an 8MHz AT-class PC. Compaq counts over 20 major developers that have validated the compatibility of their products on the 386; Esber and Manzi spoke for their companies' programs.

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The Deskpro 386 will build from current PC applications, notably "power users" of conventional DOS software; compute-intensive technical applications like PC CAD; and file servers for PC networks. Two other potential markets have been mentioned, multiuser/multitasking applications and artificial intelligence, but the former right now requires a user to choose Xenix over MS-DOS, while the latter must build from practically no base at all.

The most crucial market to crack is the first, since there are undoubtedly a large number of individuals in major corporations who either are or would like to style themselves "power users" of 1-2-3, dBase, et al. The elements of the PC CAD market that are topping out on what a 286-based system can offer (see the Gray Sheet, Vol. 22, No. 7, July 31, 1986) will need little prodding to investigate the 386, while at the other extreme the file server market is still so jumbled with competing strategies that it will be some time before it sorts itself out sufficiently for any single approach to dominate.

That the Deskpro 386 currently offers power users (or anyone else) only a doubling or tripling of performance is the fault of neither Compaq nor Intel. A 16MHz 32-bit chip that cannot run 32-bit code because it doesn't yet exist cannot be expected to optimize performance but so much. When Microsoft delivers an operating system capable of fully supporting the 80286 chip, DOS multitasking will become feasible; when the follow-on generation of MS-DOS, capable of exploiting the 32-bit 80386, appears, the Deskpro 386 would allegedly be able to run over ten times as fast as current PCs. How long, oh lord, how long? Canion says he can't tell, and Bill Gates won't.

In the meantime Compaq and Microsoft are offering an 80286-based version of Xenix, and promise Xenix 386 for the first half of 1987, but only as an either/or choice for current DOS users. Intent on not moving too far ahead of IBM, Compaq has chosen to ignore the capabilities of the 80386 to run two operating systems concurrently in native mode until IBM establishes a de facto standard for the necessary virtual monitor or "hypervisor" software.

What else, then, could Compaq do to persuade users to join up now, before the depths of the 80386 can be plumbed? Pricing. The suggested resale price of the Deskpro 386 with a half-height 40MB hard disk providing 28ms response and 1MB of standard RAM will be $6,499, 35% more than the Deskpro 286 (which is less than half as powerful and comes with a 30MB disk and 640KB of RAM). For another 35% increase in price (to $8,799), the user can get a 130MB disk offering an industry-leading average access time of 19 milliseconds.

The suggested prices, which elicited murmurs of shock and awe through the audience, are the keystone of Compaq's strategy to meet two classes of competitors. Price will not be far out of line with turbo-ATs with an 80386 board (Canion also argues that there are compatibility problems without the wholesale re-engineering Compaq used to create a new PC). And at that price point there is the prospect of selling enough 386 PCs that Compaq will have established the critical mass required for a non-IBM de facto standard no matter what IBM does. In fact, some of Rod Canion's most intriguing comments were aimed at what IBM could do to improve on the Deskpro 386, which are given here simply for purposes of information, not necessarily because the Gray Sheet accepts them.

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CURRENT IBM AND COMPAQ MODELS: FEATURES AND SUGGESTED RETAIL PRICES
(Source: IBM and Compaq Computer Corporation)

	Processor	RAM	Floppy	Hard Disk	Price
IBM					
Personal Computer	8088	256KB	single 360KB		$1,845
Personel Computer	8088	256KB	dual 360KB		$1,995
Convertible	80C88	256KB	2 3.5" 720KB		$1,995
XT	8088	256KB	single 360KB 1/2 or full ht		$2,145
XT	8088	256KB	dual 360KB 1/2 or full ht		$2,295
XT	8088	256KB	single 360KB	10MB	$2,895
XT	8088	640KB	single 360KB	20MB	$2,895
XT-286	6MHz 80286	640KB	single 1.2MB	20MB	$3,995
AT	6MHz 80286	256KB	single 1.2MB		$3,995
AT	6MHz 80286	512KB	single 1.2MB	20MB	$4,895
AT	8MHz 80286	512KB	single 1.2MB	30MB	$5,295
COMPAQ					
Portable	8088	256KB	dual 360KB		$2,199
Plus	8088	128KB	single 360KB	10MB	$3,199
Portable II-1	8/6MHz 80286	256KB	single 360KB		$3,499
Portable II-2	8/6MHz 80286	256KB	dual 360KB		$3,599
Portable II-3	8/6MHz 80286	640KB	single 360KB	10MB	$4,799
Portable II-4	8/6MHz 80286	640KB	single 360KB	20MB	$4,999
Portable 286-2	8/6MHz 80286	640KB	single 1.2MB	20MB	$5,499
Portable 286-3	8/6MHz 80286	640KB	single 1.2MB	20MB 10MB backup	$6,199
Deskpro-1	8086	128KB	single 360KB		$2,144
Deskpro-2	8086	256KB	dual 360KB		$2,399
Deskpro-3	8086	640KB	single 360KB	20MB	$3,144
Deskpro 286-1	8/6MHz 80286	256KB	single 1.2MB		$2,999
Deskpro 286-20	8/6MHz 80286	640KB	single 1.2MB	20MB	$3,999
Deskpro 286-2	8/6MHz 80286	640KB	single 1.2MB	30MB	$4,799
Deskpro 386-40	16MHz 80386	1MB	single 1.2MB	40MB	$6,499
Deskpro 386-130	16MHz 80386	1MB	single 1.2MB	130MB	$8,799

The key question in Canion's scenario would be whether IBM offered 32-bit ports. Compaq avoided creating its own 32-bit bus, and has kept its distance from the PCET Standards Committee's effort to standardize a bus architecture for the 80386. In Canion's view, the extra speed possible in a 32-bit external bus would be largely extraneous, since (1) graphics performance in displays is typically a function of dedicated processors, not bus speeds (the EGA standard still depends on an 8-bit bus); and (2) in external storage "the limiting factor is the speed of the disk itself -- not the size of the bus."

The second point may not be relevant at an access time of 19ms, but Compaq can work to IBM's standard if it does utilize 32-bit ports. Also, Canion did not mention possible hooks into proprietary IBM operating systems with a hypervisor. Still, an aggressive vendor could establish itself with the 80386 before IBM does something inimitable -- and that's what Compaq is trying to do.

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The appearance of Compaq's Deskpro 386 is the latest reminder of the delicate balance between innovation and commoditization in the computer industry. Product generations are closer to a mayfly's than to the generations of man.

By Compaq's count, there have been three generations of PCs in less than a decade. First there was the 8-bit Apple II with 64KB of RAM, then the IBM PC, with a 16-bit chip and a memory ceiling of 640KB. Compaq counts the Deskpro 386 as "the first of the next generation PCs." Others would attach generational status to the AT, which even without an operating system to maximize the potential of the 80286 chip could run programs up to three times faster and whetted users' appetites for hard disk storage. In any case, it is clear that the 80386 does mark a new generation of PCs.

And in that time, as the new came along, the old either died out or moved upscale. The most recent example is the Apple IIGS (which the Gray Sheet, like many others, was disappointed to learn stands for Graphics/Sound, not Granny Smith). For a $999 base price, it offers a 16-bit 65C816 processor that can run Apple II software supposedly up to thrice as fast as on previous products. The "G" in its name signifies 640 or 320 X 200 resolution for a palette of 4,096 colors, with 4 to 16 colors per scan line; the "S" a dedicated Ensoniq sound chip so that when you're playing Frogger, you really know it when you squish a frog on the road. Internal memory is now expandable from 256KB to 1MB via an expansion card, with promises of eventual access to 8MB of RAM. And you get a graphics interface -- in other words, practically a Mac in all but name.

Concerning the IBM universe, analysts quibble over whether the 80386 chip more directly obsoletes the 8088 or the 80286. In any important sense, neither is now outdated. The price spread is wide enough that there will be ample room for both at the low end of the price and profitability spectrum. The issue, though, is how rapidly the 80386 generation establishes itself.

As to the 8088, an announcement of the discontinuation of new production of the original IBM PC is clearly pending (probably the only thing holding up the funeral services has been the birthday party IBM threw for it earlier this month on the fifth anniversary of its introduction). Meanwhile, despite IBM's efforts to maintain a threshold price of $2,000 for its PCs, prices of under $1,000, even under $700, for 8088-based IBM compatibles are on the rise.

As to the 80286, all an AT can now do differently is run the same programs faster; 80386 systems will run them far faster for what many users will probably decide is really not that much more money. And AT-clones are so numerous now that not only IBM has been affected -- one likely reason for Compaq's eagerness to pioneer with the 80386 is that it prefers the profit margins in the high-end lane but had lost its clear functionality edge compared to its IBM-compatible competition for 80286-based systems.

PRICE, PERFORMANCE, PROGRESS AND POVERTY

The importance of this ever-crescendoing progress in price/performance can never be stressed enough, for it extends far beyond personal computers. If one turns to large-scale systems, the shift from leasing to buying mainframes has accentuated vendors' dependence on the brief periods when performance and price are both relatively high, just as, to a degree, the change has resulted from the acceleration of technological innovation.

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PRICE/PERFORMANCE OF IBM LARGE-SCALE SYSTEMS AT INTRODUCTION, 1970-1985*
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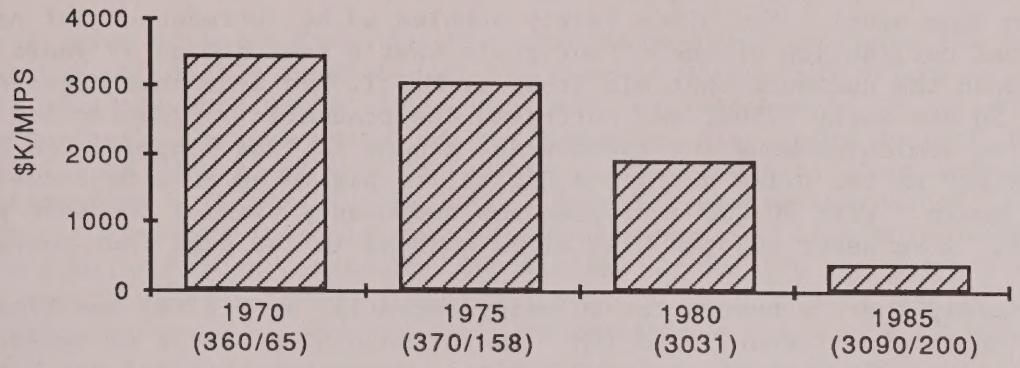


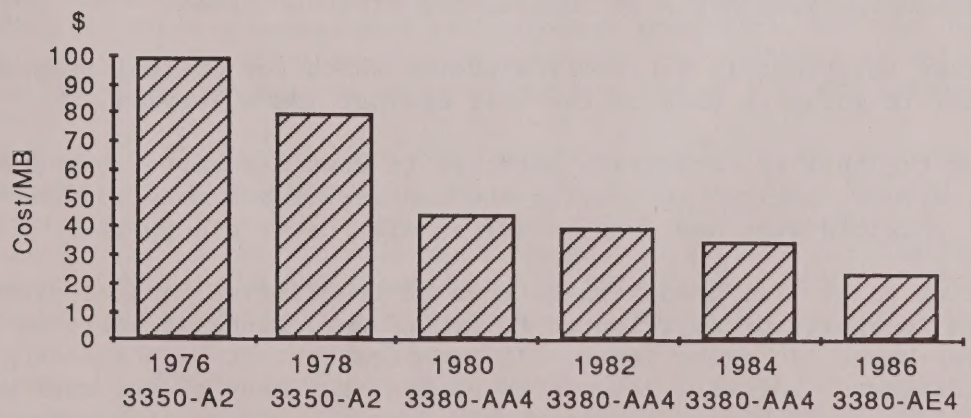
*Read MIPS estimates as conversion factors, not performance benchmarks.

The perils are reflected in IBM's current bottom line, as too many users balk at buying the new mainframe generation during the optimal period for Big Blue. Nor is the issue restricted to CPUs. In large-scale storage as well, financial success depends on IBM riding the curve of declining costs per megabyte with the agility of an expert windsurfer.

The problem has been even more burdensome for the Bunch, where three of the original members (Sperry, Honeywell, and CDC) have found it difficult (at least on their own) to keep up with the new technology necessary to implement new product cycles quickly enough to maximize the number of moments of high profitability. The consequences may be found in the pages of the past year's Wall Street Journal detailing financial travail and merger activities.

The Gray Sheet will soon be treating some of these issues in greater detail -- the probability of Honeywell's exit from the computer sweepstakes; the complex skein of choices now facing users of large-scale storage; the prospects for a rebound in mainframe sales over the coming months. What must not be lost amid the details is the context in which all industry vendors must struggle to squeeze profits through ever-narrowing technological windows.

COST PER MEGABYTE OF IBM LARGE-SCALE DASD, 1976-1986
(Copyright 1986 -- International Data Corporation)



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VAXMATE AND DIGITAL'S PC COMMUNICATION REVOLUTION

The Chairman Ken show kicking off Digital's September 4 announcements was even more fun than usual. Ken Olsen fairly bubbled as he introduced what he called "the final culmination of one of our goals that's been around 12 years or so." He reminded the audience that his group at M.I.T. had been investigating networking in the early 1950s, and portrayed the traumatic reorganization of the 1980s from semiautonomous entrepreneurial groups to "One Company, One Strategy, One Message" as the price he forced Digital to pay to be able to focus on networking again. With 90,000 employees now supposedly sharing the same passion and goal, "I've never enjoyed Digital as much as in the past four years."

Certainly there's been a lot to enjoy recently, as Digital has finally become the chief alternative to IBM. In introducing products to network IBM-compatible PCs with other (read Digital) computers, Digital has both the disadvantage and advantage of its new near-equal position. The functionality of its offerings will be judged against all other vendors as well as the utopian ideal, and will inevitably be found wanting by some. Yet its products also almost automatically get on the short list, and will be bought by some just because they come from Digital. In short, it will be treated like IBM.

The products are two software solutions that divide the PC networking problem in twain, and a PC built around networking rather than vice-versa. The announcement showed that Digital is still unsure about how to market them in some respects, but also displayed for the first time the outlines of a coherent strategy on Digital's part for dealing with the PC revolution.

The most significant of the announcements is probably VAX/VMS Services for MS-DOS, an awkward and unmemorable name for software permitting VAX systems to act as servers for IBM-compatible PCs in a departmental local area network.

- Task-to-task and peer-to-peer communications among PCs, servers, and minis is for the first time delivered (not just promised) by a major vendor. For example, in DECnet DOS, which VAX/VMS Services replaces, PCs had to emulate VT100/200 terminals.

- MS-DOS files are automatically stored on the server in VMS format, where they can be accessed by VT100 terminals for other VAX systems or converted back into MS-DOS for concurrent use on PCs.

- All communications occur at 10Mb/second Ethernet speed.

- The user interface is Microsoft Windows, which for obvious reasons Digital is going to back to the hilt against IBM's Topview.

- Noting the ability of VAX/VMS Services to download server-based DOS applications, Digital is touting the managerial and monetary controls possible when one program serves all PCs in a network.

The latter point also demonstrates some of the difficulties of pioneering in the terra incognita of distributed PC processing, since it embroils Digital in the server-based licensing issue. It promises that it is now arranging with key independent software vendors to ensure that many of the most popular programs will be available in a networkable format. Microsoft has agreed to make Multiplan and Microsoft Word, Project, and Chart available for VAX

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servers, Access Technology's 20/20 is ready now for server licensing, and, in lieu of direct participation by Lotus, Digital announced for it that the two companies are cooperating to bring 1-2-3 and Symphony to the servers.

The absence of Lotus from the announcement probably reflects the fact that, while it has officially committed to the concept of special prices for server software on a per-user basis, it has not yet resolved how to establish a new price structure. Significantly, of the companies disclosing current or future availability of server software in concert with the Digital announcement, only one (Information Builders, for PC/FOCUS) detailed what server-based licenses would cost. Pressure is building on software companies from both large customers and major hardware vendors like Digital to resolve the networking issue, but for now the server-based licensing aspect of VAX/VMS Services is a hostage of the major software players who will determine how attractive it will be.

Digital left a few question marks of its own. The press release noted that VAX/VMS Services are available now only on its new VAXmate, but also that the program would be extended to Digital Rainbows and IBM XTs and ATs next year. In point of fact, the oral presentations disclosed that VAX/VMS Services is networking IBM PCs at nearly 100 sites right now. The program will be in limited availability until January, but many other users will be able to get VAX/VMS Services for their IBM and compatible PCs well before 1987.

The issue could be that in this case it's Digital that hasn't decided how to price a product -- viz., the network integration kit with Ethernet connection that will be required on all IBM-compatible PCs except the VAXmate. Otherwise, the price for VAX/VMS Services for MS/DOS will vary according to the configuration, from $650 to $19,500.

The other new networking software offering from Digital is addressed more directly to office automation. PC All-in-1 brings the company's popular integrated OA software into IBM PCland, where up to 30 users can participate in All-in-1 services (WPS-Plus word processing, E-Mail, standard user interface, etc.) through a dedicated MicroVAX II. However, priced at $81,160 (including the MicroVAX II and a laser printer), it is a pretty expensive solution to problems that Digital is going to have to learn to define better. Maybe All-in-1 menus will indeed help "the owners of all those underutilized and unused PC[s] who wanted personal computing but didn't have the time or the inclination to learn MS-DOS commands," but for over $80,000?

Other comments on the market for PC All-in-1 were more plausible (e.g., facilitating PC network management with minimal training), but the Gray Sheet expects that its potential awaits the day when its software is detached from hardware and tied in with the wider functionality of VAX/VMS Services.

And then the VAXmate, which received less attention at the announcement than the overall networking strategy of which it is part. Digital's new PC is an attractive enough entry to the crowded field of AT-compatibles (8MHz 80286 chip; convection cooling to eliminate fan noise; support for Digital's graphics resolution of 800 X 250, MS-Window's of 640 X 400, and IBM's of 320/640 X 200; price $4,045 plus $250 software license). However, the raison d'etre of the VAXmate is its built-in thinwire Ethernet connection, which will allow it to participate in VAX/VMS Services more expeditiously than PCs with network integration kits. This, then, is what lay over the Rainbow: an IBM-compatible PC from Digital with a real rationale this time around.

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• CDC TRADES CREDIT FOR CASH. Control Data is now successfully implementing last year's failed strategies to revive the company's long-term prospects. First it placed a debt offering to fund short-term bank debt similar to the one it had to abort last fall, and now it has announced that it will sell 80% of Commercial Credit, which was on the block for several months last year without generating much interest. Control will pass to Sanford Weil, a finance baron who needed a new castle to replace American Express as his base; CDC could get as much as $1 billion; and Commercial Credit regains a good credit rating.

• DONE DEAL IN DETROIT. The Burroughs-Sperry merger is complete with word that Burroughs shareholders have voted to distribute a mix of Burroughs convertible stock and cash for the remaining shares that Burroughs did not already control, and that Sperry shareholders have voted to accept it.

• HONEY BULLNEC. For our perspective on what is prospectively the big news in the Bunch this month, see the next issue of the Gray Sheet.

• IBM -- OPEN ARCHITECTURE PIONEER! In conjunction with a new NetView/PC program that allows MIS shops to manage the Token Ring and detect errors, IBM has published the specifications of an application programming interface (API) that will allow users for the first time to develop software to tie non-IBM products into SNA in a multivendor environment.

• GOOSING THE RT. Probably in response to lower-than-anticipated sales, IBM has sharply lowered prices on existing RT models (the entry-level system has been slashed 32.5%, to $7,900, with the others down around 20%), introduced a new model, and unveiled several additional programs and options (e.g., a new version of AIX with LU 6.2 capabilities, a floating point expansion card, and simulation programs for circuit design).

• JOLTIN' JOE HAS GONE. The $10.6 million dollar loss posted by Cullinet for the most recent quarter was the backdrop for a special press briefing on September 9 emphasizing its decision to support SQL in future DBMS offerings and to broaden its potential market by introducing VAX-oriented products.

• TELEVIDEO PLAYS WHITE KNIGHT. Facing a bid by Point 4 Data Corp. to acquire it in two stages (half at $6/share, half at $5.50), Alpha Microsystems found a more generous suitor in Televideo, which will pay $8/share (half in cash, the rest in stock), or some $25 million for the small-scale systems vendor, and supposedly keep Alpha Micro's current management team around.

• ADMIRALS JUMPING SHIP, GETTING PIPED ABOARD. Admiral B. R. Inman has announced that he will not renew his contract as CEO of MCC beyond this year, presumably so that he can find a more logical launching pad for the C.I.A. directorship if a Democrat wins the 1988 presidential election. Meanwhile Admiral Grace Hopper's second forced retirement from the Navy is being followed by a tour of duty with the Washington office of Digital Equipment.

• DEPT. OF AMPLIFICATION AND EXPLICATION. Contrary to what was reported in the August 29 Gray Sheet (Vol. 22, No. 9), Anheuser-Busch has not committed to Unix for communications; Unix is currently in use in an applications environment. We regret the misinterpretation.

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THE GRAY SHEET
Computer Industry
REPORT

D.C.BELLOMY, EDITOR August 29, 1986 • VOL.22, NO.9 P.J.MCGOVERN, PUBLISHER

THE VIEW FROM THE SERAGLIO: UNIX MOMENTUM GRADUALLY GROWING

Now that System V, Release 3.0 is finally official, it's time to investigate the burning question of whether Unix is the Pia Zadora of operating systems -- a pulchritudinous, architectually sound creation of an immensely rich backer, initially a media darling, next universally derided as a failure until her true metier is discovered and exploited -- and even then there are doubters.

It has been 17 years since Dennis Ritchie and Ken Thompson invented Unix on a PDP-7 in Bell Laboratories, 15 since it became operational as a small timesharing operating system, and 13 since it was rewritten from assembly language to C, structured with utility programs outside the kernel, and first licensed outside the AT&T organization, initially only to universities.

Nineteen eighty six marks the tenth anniversary of the first commercial licenses of Unix. But to confuse matters, a Bell spokesperson described as the true "birth of commercial Unix" the introduction of Programmer's Workbench (PWB)/Unix, delivered internally in 1975 and first licensed outside AT&T in 1977. The next time AT&T gave birth to "commercial Unix" was 1981, when it merged PWB/Unix with "Research Unix" to create System III, and made commercial licenses financially attractive for the first time. And then in 1983, in the wake of the breakup of AT&T, it moved to make Unix commercially viable (not necessarily the same thing as commercially available) by standardizing on System V and reaching agreements with major semiconductor manufacturers.

To what avail? By 1985 Unix had achieved at best a fairly firm but still miniscule toehold in the computer industry:

- The worldwide installed base of computer systems running Unix (either as the resident operating system or as a guest) totaled 277,160 systems, just over 1.5% of all nonhome-oriented systems.

- Unix shipments in 1985 (defining shipments to include both new systems with a Unix operating system or option and new Unix licenses to systems in the installed base) were equivalent to only 2% of all nonhome systems shipped last year.

- The value of these shipments came to $3.61 billion, 6% of the worldwide total for nonhome systems.

- In 1985 AT&T was the market leader in units shipped (19,370 systems) and the value of shipments ($665 million), but Numbers Two and Three in shipment value were two vendors with no stake in propagating the Unix standard: Digital ($580 million) and IBM ($380 million).

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But there is one significant piece of evidence that Unix has finally turned a corner: the 116,430 Unix-based systems shipped in 1985 (using the special definition of "shipment" that will continue to be employed throughout this issue's discussion of the Unix market) represented a little over 40% of the total Unix base installed by computer vendors over the past decade.

From this turning point, IDC projects that:

- The worldwide Unix installed base in 1990 should approach 2,173,790 systems, or 4% of the total. This represents a compound annual growth rate of 51%, compared to 22.5% for all nonhome systems.

- Unix shipments will rise to around 688,550 systems, or 7% of the total. Annual growth of nearly 43% will be responsible for this expansion, compared to 13.5% for all nonhome system shipments.

- The value of Unix shipments in 1990 will climb to around $9.92 billion, or 10% of the total. The compound annual growth rate for shipment value is less spectacular at around 22.5%, but still better than double the rate for all nonhome shipments of under 10%.

The down side of these attractive growth figures is that they are so high because growth in the past has been so low; they speak just as eloquently of past failure as of future success. But they do murmur musically for vendors who are able to create products and marketing strategies that can take advantage of the accelerating tempo of Unix sales.

Changing the Unix Balance Sheet

The problems that have hitherto stalled Unix growth may be mitigated, but they will continue to plague it through the rest of the decade.

The commercial Unix software gap will remain an issue for the immediate future. In certain submarkets with an adequate supply of programmers, this is less of a drawback, since one of the chief assets of Unix is that it is relatively easy to write to, particularly for the myriad who learned Unix programming in college. However, to move from the niches to the general purpose market requires a larger library of application software.

While the Unix market is one of the few areas of potential growth tempting young software companies, the more established vendors have by-and-large not been convinced of the commercial future of Unix and have so far declined to offer Unix versions of their most popular programs. This assumption is particularly widespread among PC software companies, and is one of the principal reasons why Unix acceptance on PCs has been so tardy.

The software vendors' assumption is in turn fed by the perception that Unix is still not competitive in many commercial environments, despite many improvements over the past half decade since AT&T first merged PWB/Unix with the standard research-oriented version, and especially since it began importing some of the most popular aspects of Berkeley 4.2 Unix into System V in 1983.

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WORLDWIDE UNIX SYSTEM FORECAST, 1985-1990:
ALL U.S.-BASED VENDOR NONHOME SYSTEMS
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	All Units Shipped	Unix Units Shipped	% Unix
1985	5,468,290	116,430	2%
1986	6,553,790	150,945	2%
1987	7,413,430	251,620	3%
1988	8,288,080	374,515	5%
1989	9,411,650	494,060	5%
1990	10,319,550	688,550	7%

	All Units Installed	Unix Units Installed	% Unix
1985	18,040,700	277,160	2%
1986	23,999,300	419,505	2%
1987	30,657,730	660,930	2%
1988	37,336,730	1,023,220	3%
1989	43,883,840	1,502,625	3%
1990	49,703,280	2,173,790	4%

	Value Shipments $M	Value Unix $M	% Unix
1985	60,000	3,610	6%
1986	65,150	4,270	7%
1987	72,050	5,485	8%
1988	79,460	6,695	8%
1989	87,740	8,160	9%
1990	95,780	9,920	10%

VALUE OF UNIX SYSTEM SHIPMENTS, 1980-1990
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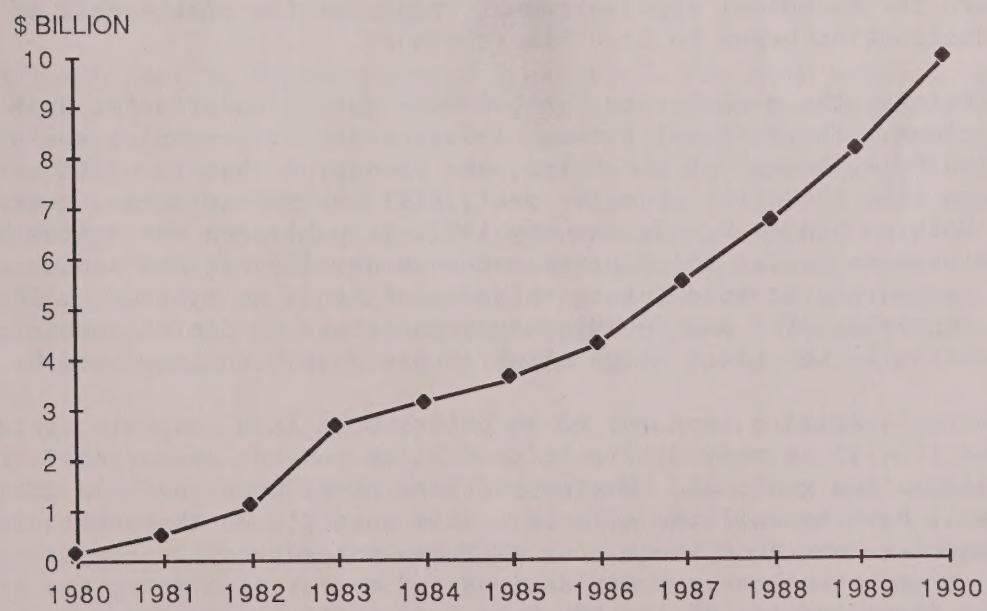

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Unless/until AT&T incorporates them into official Unix, most commercial improvements will continue to come from established vendors and young startups anxious to address those shortcomings most germane to their own markets. Thus Hewlett-Packard has been incorporating better real-time capabilities in HP-UX, the Unix version to which HP plans to migrate users of its 9000 and 1000 lines during the gradual expansion and consolidation of its Precision Architecture.

Similarly, Tolerant Systems has attracted attention less by its parallel multiprocessor architecture, which is similar to other vendors' offerings, than by its response to the relatively poor performance of Unix in online transaction processing. Because Tolerant's TX operating system adjusts Unix to run as message- rather than call-based, it is supposedly better suited for OLTP.

A third inhibiting factor has been the compatibility issue. If the ability of Unix to run across different hardware architectures is a plus, a distinct minus for many potential purchasers is the prospect of yet another addition to their mare's nest of incompatible operating systems from IBM, Digital, et al.

A related problem is the fact that there is still no standard version of Unix. Vendors and users hesitate to commit themselves to an operating system so unstable that there have been over 30 different versions floating around in the marketplace. Back in the 1970s government regulations dictated that AT&T could deliver the source code for Unix to anyone seeking a license, but could provide no support, maintenance -- or direction. Licensees made any modifications or corrections they thought necessary. Moreover, each successive Unix version offered by AT&T in the late 1970s presented subtle but sometimes significant differences, further confusing the question of what Unix was.

Not all the consequences of AT&T's "Let a Thousand Flowers Bloom" approach to Unix development were untoward, since the enhancements that some licensees developed better addressed user needs than the original AT&T offerings. The most important enhancements of Unix were created by researchers at the University of California at Berkeley. While AT&T endeavored to make its Unix version more appropriate for commercial use, Berkeley Unix (BSD 4.2) became the standard for technical applications. Only over the past couple of years has this distinction begun to lose its relevance.

Nevertheless, the need for de facto and de jure standards for Unix has long been clear. The National Bureau of Standards, for example, would like to see a united Unix throughout the Union, and is hoping that the IEEE version of System V can fill the bill. For its part, AT&T has made progress towards standardizing Unix on System V. In January 1985, it published the System V Interface Definition to assist third-party software developers, and announced that Microsoft had agreed to mold future releases of Xenix on System V. The following September AT&T and Sun Microsystems agreed to finish combining BSD 4.2 with System V, the first stage of which has just been announced by Sun.

But there is still a long way to go before Unix is a complete, integrated entity, and it will be very difficult to make an end-run around AT&T to reach the standardization goalpost. Whatever others might hope, Unix is AT&T's ball, and AT&T will have to call the signals. This suggests another obstacle to wider commercial Unix acceptance, for AT&T has not gotten its computer act together. After countless reorganizations and marketing strategies, it is not yet a major force outside of its BOC base, and still has to demonstrate that it can deliver on its pledge to achieve a standard version of Unix.

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1985 WORLDWIDE SHIPMENTS (UNITS AND VALUE) OF UNIX SYSTEMS BY VENDORS
(Copyright 1986 -- International Data Corporation)

Vendor	Unix/ Xenix	$M Value	PC Units	Small Units	Medium Units	Large Units	Total Units
AT&T*	Unix	665	12,600	5,570	1,200	-	19,370
Digital	Ultrix	580	800	5,400	2,085	-	8,285
IBM	Xenix/IX 370	380	14,500	450	120	40	15,110
NCR	Unix	250	-	8,200	-	-	8,200
Altos	Xenix/Unix	110	-	13,000	-	-	13,000
Amdahl	UTS	100	-	-	-	55	55
Sun Micro	Unix	100	6,400	-	-	-	6,400
Convergent*	Unix	95	-	3,600	-	-	3,600
Apollo	Unix	92	1,800	-	-	-	1,800
Tandy	Xenix	80	-	14,000	-	-	14,000
Intel	Xenix	70	-	2,000	-	-	2,000
Valid	Unix	45	1,100	-	-	-	1,100
Pyramid	Unix	25	-	-	180	-	180
Other		1,018	7,800	15,000	500	30	23,330
Total		3,610	45,000	67,220	4,085	125	116,430

*Models manufactured by Convergent for AT&T are counted as AT&T shipments.

So how come Unix has made as much progress as it has, and why is accelerating growth anticipated? Several market forces have recently been converging:

User Interest in Common, Nonproprietary Standards. In particular, one crucial user market has been signaling its interest in Unix: the U.S. government. Although Washington seldom speaks with one voice, or very clearly, the fact that the government now often makes Unix connectivity a requirement on contract bids is one factor behind the decision of major vendors to offer Unix as a guest under or alternative to proprietary operating systems, and of Sperry to offer a completely Unix-based midscale line built around offerings OEMed from three different manufacturers.

Vendor Interest in Nonproprietary Standards. For many vendors, going with Unix is less a technological or user-driven issue than purely a business decision: it means that they don't have to develop their own operating system, and can tap into a base of trained Unix programmers. Moreover, if enough vendors standardize on Unix, it could give them the critical mass to compete better with systems running on proprietary operating systems from the industry behemoths, notably IBM. The latter consideration topped the list for the six leading European vendors that formed the X/Open consortium in 1985 to implement nonproprietary standards, specifically Unix. Three U.S. vendors (Sperry, Digital, and Hewlett-Packard) have since joined X-Open.

Although X/Open indicates the lure of Unix for established vendors, it has proved most attractive to companies developing systems around 16- and 32-bit microprocessors. Although some Unix supermicros come from well-known vendors (e.g., NCR's Tower series), most have been developed by startups without the time, capital, or market leverage to create proprietary operating systems. However, while it seemed in early 1985 that Unix was the emerging standard for supermicro architecture, the success of Digital's MicroVAX II indicates that open and proprietary approaches to supermicros will have to learn to coexist.

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Technical Workstations. Through 1985 and 1986 there has been a massive movement towards Unix in the technical workstation market. This development has broader implications, in part because some of the workstations could have wider penetration, but more importantly because (1) they are creating the incentive for more extensive third-party software development, and (2) they are increasingly the focus of scientific/engineering activity. Future multiuser systems installed in such environments will often find Unix options advantageous for uploading and downloading material to and from the workstations.

While technical workstations emerge as the hinge on which much of the growth of Unix in the scientific/engineering community will turn, other developments should add new arenas for Unix in the commercial market.

For example, while large corporate users will continue to eschew Unix as an alternative operating system, it can become more attractive to information managers as its abilities as a communication environment are better exploited, helping to link together heterogeneous microcomputers, operating systems, applications, and communications facilities.

Used at the uppermost level of a layered network standard like ISO, Unix can allow for higher-level protocols and hence transparent file access. NCR is marketing its Tower series in the Fortune 1000 as a solution for linking PCs and providing companywide ties, while GM, Anheuser-Busch, and First National Bank of Chicago have committed to Unix for communications. This approach offers users integration, not replacement, of the installed base, while to proprietary vendors it extends cohabitation, not competition.

Another Unix advantage that could be better exploited in MIS shops is software development and maintenance. In part, this is simply the traditional issue of C-driven Unix portability, which allows software to be developed on a small machine and then migrated to mainframes without modification. Portability also diminishes the amount of time consumed by maintenance tasks. The only problem is that users may not want to run Unix on their mainframes, but even recoding from Unix into proprietary operating systems can often be cost-effective, since Unix is typically more easily manipulated than other environments.

A more problematic opportunity exists for Unix on future PC offerings. Everything won't break in a Unix direction, since future versions of PC-DOS are expected to include improved multitasking features that will cut into one current Unix attraction. On the other hand, Unix will profit from the "hypervisor" on Intel's 80386 microprocessor. It does not seem likely that the imminent introduction of 386-based PCs, even equipped with coresident Unix and PC-DOS, will erode the dominance of the DOS standard. What could happen, however, is that the dual operating systems will give a significant nudge towards incorporating Unix as a standard communication medium with larger systems.

The future, then, bodes well for systems running Unix, particularly if AT&T and other vendors vigorously address the remaining drawbacks. That is still an ominous "if," and yet, after all the dashed expectations, for the first time the opportunities for Unix seem realistic rather than utopian.

Nevertheless, the computer market is not a cohesive entity. The anticipated growth rates cited on the second page speak to varying degrees and rates of penetration in the four major processor categories identified by IDC, and different attractions and impediments in each.

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WORLDWIDE UNIX SHIPMENTS BY SIZE CLASS (UNITS AND DOLLAR VALUE), 1985
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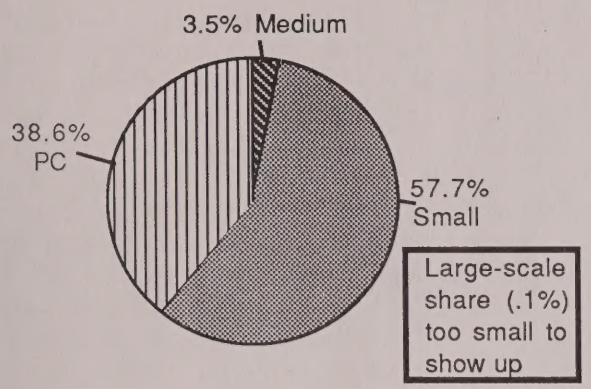
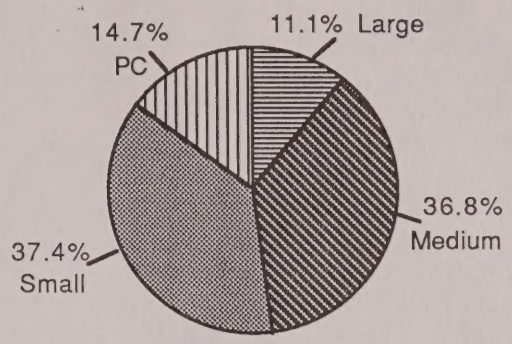


116,430 SYSTEMS



$3.61 BILLION

Unix Market Profile

By any measure, the center of Unix activity in the computer industry has been the small-scale systems market, home of the supermicro. It has drawn the largest number of vendors (nearly 30), and in 1985 shipped the largest number of units and accounted for the largest slice of the Unix revenue pie. Over 20% (67,220 units) of small-scale shipments in 1985 were Unix-based; their value came to $1.35 billion, or 11% of the value of all small-scale shipments. Because of the degree of market penetration, IDC's projections for small-scale Unix growth rates through 1990 are comparatively modest, although still somewhat higher than the industry averages for all small-scale systems.

The second-highest market penetration by Unix has been achieved in medium-scale systems, particularly superminis due to interest in the technical community. In 1985, 4,085 Unix-based medium-scale systems were shipped, accounting for 10% of all shipments in the category. Shipment value for Unix medium-scale systems in 1985 came to $1.33 billion, or 9% of total medium-scale revenue.

Although AT&T and Pyramid started out with a Unix-based strategy, much of the Unix action over the past couple of years has emanated from traditional supermini vendors with proprietary operating systems. Customer demand has led Digital, Data General, Prime, HP, and others to add Unix options. Digital's attitude towards Unix symbolizes some of the crosscurrents buffeting proprietary supermini vendors. It talks a good Unix line, but it also uses the immense software library of VMS applications as a lure for new VAX hardware sales. Digital did not officially announce support of Ultrix, its Unix version for the VAX line, until 1985, several years after starting to sell it to users who demanded a Unix option. Almost in spite of itself, Digital was the market leader in Unix shipments for the medium-scale market in 1985.

The spectre haunting the traditional supermini vendors is not Unix per se, but the advent of young startups, most of them multiprocessor-based, a few of them sporting parallel processing architectures, that are making a bid for the high-end scientific/engineering market. Their selling point will be price/performance: often for much less money than a supermini, they boast mainframe or near-supercomputer performance capabilities. And most run on Unix.

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As Convergent Technologies and AT&T have learned to their regret, the same cannot and will not be said for personal computers. The 12,500 shipments of AT&T's Unix PC in 1985 represented the biggest disappointment of the year for Unix aficionados. Convergent Tech has renegotiated the contract under which it manufactures the system for AT&T, and its recent layoffs are directly related to the disparity between AT&T's hopes for and the market's interest in a Unix PC. Overall, even after subtracting home-oriented computers, which could not be expected to offer realistic opportunities for Unix-based systems, the 45,000 PC shipments with Unix in 1985 came to under 1% of the year's total.

Fortunately, the future is much more propitious, if not as glamorous as in other market segments. By 1990, IDC projects, Unix-based PC shipments will total around 520,000 units, or 5% of total nonhome shipments, valued at $1.6 billion, 6% of total retail value of nonhome PCs. Coresident Unix on 80386-based systems will be one factor; the other will be Unix-based technical workstations, now validated by Apollo, Digital, and IBM. And with continued growth of the engineering workstation market rides a significant portion not only of Unix's future in personal computer sales, but also of its potential in multi-user systems that must interact with the desktops where the work is being done.

The other area where Unix has hitherto lagged has been large-scale systems. Mainframes, after all, are typically commercial workhorses from a blue-hued vendor with little use for an AT&T-developed operating system. Nevertheless, there are signs that a trend towards Unix is gathering momentum even here. In 1985 less than 1% (160 units) of the worldwide installed base of large-scale systems offered Unix as a guest operating system, yet over three-quarters of the Unix installed base were shipped last year. The 125 large-scale systems with Unix represented 4% of 1985 shipments, and 2% of shipment value.

Much of the large-scale Unix action has been and will continue to be as guest operating systems. In February 1985, IBM announced IX/370 as a Unix guest under VM/SP for any S/370 offering -- and whenever IBM blesses an aspect of the industry, there are some users who will start to cross themselves. To date, however, Amdahl has been the most successful vendor offering guest Unix on mainframes, to which it has now added UTS/580, the first native Unix operating system for 370-architecture computers, and one of the very few attempts to bring a completely separate operating system into the IBM marketplace.

The value of large-scale Unix shipments should blossom due to the trend towards Unix in the high end of scientific/engineering computers. Cray, the most potent force in supercomputers, has announced that future products will run on Unix, as has ETA, the CDC subsidiary. As supercomputers inch into the commercial marketplace as well as their research and defense strongholds, the position of Unix throughout the large-scale universe will be strengthened.

Moreover, the Japanese SIGMA project, a joint government-industry program to enhance Japanese software development for mainframes, has selected as its operating system an enhanced version of Unix, which was chosen for two reasons: it is portable across different architectures, and it is not from IBM. But, to return a final time to the difficulties still facing Unix, some industry participants are starting to have second thoughts. What, they wonder, if AT&T finally does become a major factor in the international computer market, and decides that the time has come to end its open-door policy on Unix? They could find themselves back right where they started from. The future of Unix still depends to a great extent on AT&T -- and that worries a lot of people.

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THE GRAY SHEET
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TRADITIONAL BUNCH PROBLEMS STILL PLAGUE BURROUGHS-SPERRY

On July 11, 1986, the Bunch, the unofficial grouping of five increasingly disparate (and sometimes desperate) computer vendors, officially died. On that day Burroughs acquired effective control of Sperry Corporation on the completion of its cash tender offer for 31 million shares. The remaining shares will be exchanged for Burroughs securities before the end of the current quarter.

Most of us only get our names in the paper when we're born and when we die, but the Bunch's press occurred in between. The birth of the "Bunch" as a conceptualization of IBM's mainframe competitors is now lost in the mists and myths of ancient history (i.e., the early 1970s), while its death brought little notice and less concern. By the mid-1980s the five companies shared few markets in common, while one (NCR) was not even selling mainframes anymore.

Nevertheless, they did share something that made the term a useful one: comparable problems in competing with IBM. And those problems will remain even after the death of the Bunch by disenvowelment.

To test current user attitudes towards Burroughs, Sperry, and their merger, International Data Corporation's QuikSurv program conducted a telephone survey of Burroughs and Sperry mainframe sites, 100 apiece, between July 29 and August 4, 1986. Among the key findings were:

- The governing mood in the Burroughs/Sperry customer base is still confusion and/or "wait-and-see" rather than enthusiasm, while a substratum of active mistrust continues among some Sperry users.
- Although most believe that separate architectures will be retained through 1990, many add (in contradiction of the Burroughs party line) that afterwards the two will gradually meld into one.
- While few Burroughs users actively oppose it, the merger will do little, at least immediately, to stanch what appears to be a serious erosion of the Burroughs mainframe base.
- The merger has neither increased nor decreased the low rate of planned Sperry mainframe acquisitions in 1986.
- A strong undertow towards IBM is evident, with 9% of the Burroughs respondents and 5% of the Sperry planning to acquire IBM mainframes in the next six months.
- Sperry currently lacks Burroughs' reputation for software, while it could help Burroughs in the area of maintenance and service.

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Burroughs Sites. When asked from their perspective as users to rate the Burroughs/Sperry merger on a scale of 1 to 5, "Strongly Disfavor" to "Strongly Favor," 84% of the Burroughs sites were willing to quantify their opinion. The median was moderately favorable: 3.4. As to whether the new combination would serve their computing needs better, 43% expected better service, 40% did not, and 17% did not know.

Among the volunteered comments, the overwhelming majority felt that the merger would have no effect on them for a while. Exactly half the respondents either declined to rate the merger or gave it a neutral "3". A significant minority agreed with the user who said, "I'm elated," sometimes because of potential competition to IBM. Only one "strongly disfavor" vote and three negative comments of the "It just doesn't make sense" ilk were recorded.

This moderate reaction was also displayed in responses to questions on the probability of conversion to another mainframe vendor prior to the merger and now. Only six sites noted a higher probability after word of the merger, the same as cited a lower. Another 31 reported the same probability, often "just shopping around." The hardcore Burroughs base, with no probability of conversion prior or subsequent to the merger announcement, is 57%.

However, 18 respondents reported that they were unquestionably converting from Burroughs. The Gray Sheet finds this the most unexpected, and potentially troublesome, survey result, one that Burroughs is understandably reluctant to accept. Citing the traditionally high customer satisfaction with Burroughs systems, a company spokesperson says that "we're certainly not having abdications," and wonders about the statistical significance of the sample.

To the first point, users don't have to notify a vendor when they decide not to buy in the future. To the second, 100 sites would represent a meaningful segment of the 900 or so large-scale Burroughs systems installed in the U.S., and a telephone survey is less self-selective than responses to a written survey. Moreover, setting aside all extrapolations, even if the 18 defectors had only one Burroughs mainframe apiece, they would still account for 2% of the company's U.S. installed base, a not inconsiderable loss.

Moreover, subsequent cross tabulations, while instructive about user assumptions, offer no evidence that the survey sample is unrepresentative:

- Five of the 18 were currently all-Burroughs shops, while 11 had IBM mainframes installed.
- Two-thirds were older 6800 sites balking at migrating.
- A couple were in markets that Burroughs has not targeted in recent years, but most were in its favored niches, including major banks and lending institutions.
- The changeover was typically related not to the merger, but to a corporate decision to change direction, often to an all-IBM shop or, in a halfway house for Bunch refugees, to service bureaus.

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CURRENT PROBABILITY OF SURVEYED BURROUGHS/SPERRY MAINFRAME SITES CONVERTING TO ANOTHER VENDOR, JULY/AUGUST 1986
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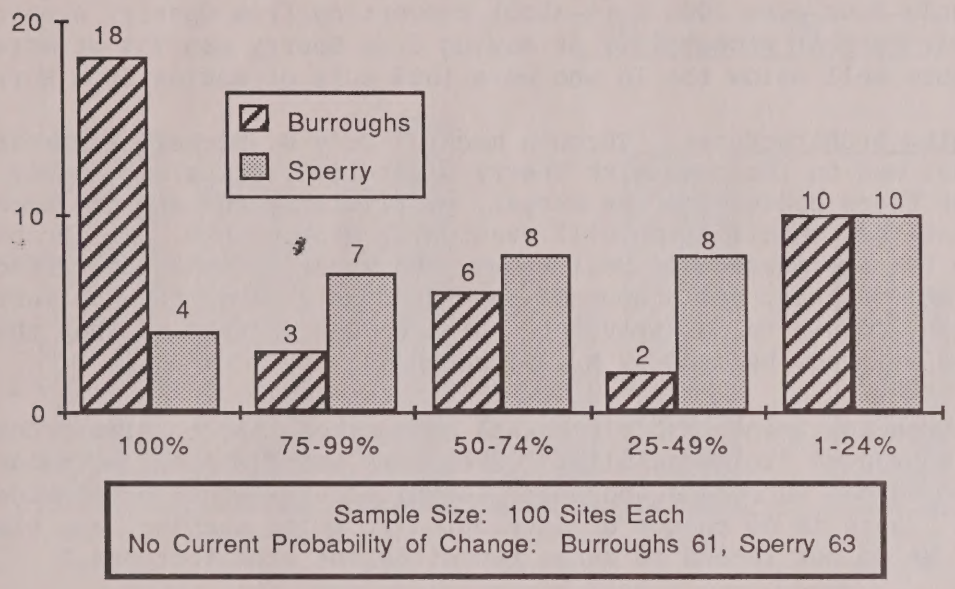

Sample Size: 100 Sites Each
No Current Probability of Change: Burroughs 61, Sperry 63

This last point suggests that MIS satisfaction with Burroughs equipment and solutions can be high, but irrelevant if other factors, and other levels of decisionmaking, are involved. For example, the potential Burroughs defection rate, so much more pernicious than in the Sperry base, could be correlated to the greater likelihood that Burroughs sites (e.g., large banks) would be more concerned to rationalize their computer applications and communications.

Sperry Users. The Sperry base was somewhat more reluctant to quantify their reactions to the merger, and distinctly more wary of its implications, than Burroughs users. One-fifth of the respondents were unwilling to rate the merger on a scale of 1 to 5. The 80 who did vote on the question gave it a marginally unfavorable 2.8, slightly below the midpoint of 3.0. While the number of sites expecting that the combined company would serve their computing needs better was about equal to the number harboring no such expectations (36 and 38 respectively), over a quarter (26) didn't know what to think.

Positive votes on the merger tended to accompany comments like, "It should help if they do half of what they claim they're going to do," and "It should help both companies economically." Few of the encomia, however, matched in enthusiasm the vehemence of the 12 "strongly disfavor" opinions. Reactions like "A stupid idea, no gain whatsoever, will end up being worthless," and "Two bad marketing organizations have combined to make a worse one," indicate the distance Burroughs must travel to assuage a significant number of Sperry users.

The 56% who declined to rate the merger or assigned it a neutral "3" speak for the majority of Sperryites, who are "cautiously watching and waiting to see what will happen." That user's attitude was repeated throughout the survey. "I don't know what I don't know," one respondent shrugged. "It might affect our plans. Time will tell." In these cliches of confusion reside doubts, but also a willingness to give Burroughs/Sperry the benefit of their doubts. It also helps that 62% of the Sperry respondents were true believers, with no probability of converting to another vendor before or after the merger.

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This negative tilt moderated by uncertainty also shows in the 16 sites reporting a higher probability of converting to another vendor in the wake of the merger, in comparison to three reporting a decreased probability. Ironically, only four were 100% sure about converting from Sperry; even the 11 who said their current probability of moving from Sperry was 75% or more represented a figure well below the 18 who were 100% sure of moving from Burroughs.

Merging Architectures. Through much of July W. Michael Blumenthal, CEO of Burroughs, was on the road with Sperry's Gerald G. Probst to answer questions and quiet fears concerning the merger, particularly the anxiety among Sperry users that the consolidation will eventually orphan them. Mr. Probst, whose distaste for the merger was well known, and whose resignation, effective at the end of the year, was announced in mid-August, seems to have left most of the talking to his fellow traveler, but everyone understood that the key decisions will now be made by Mr. Blumenthal.

On three continents Mr. Blumenthal emphasized that the two product lines will be continued "in perpetuity." Even when asked whether a "swing machine" operating across Burroughs and Sperry architectures might be considered, he replied, "There is no chance of developing a 'swing machine' any time in the future. We do not intend to merge two different architectures."

The 71% of Burroughs respondents who expect Burroughs/Sperry to retain two architectures for the next five years include a vocal minority who feel that this issue has been "explained very well by Burroughs -- we believe Mr. Blumenthal." A roughly equivalent number, though, thought that a convergence of the architectures would begin after five years. A couple of the "don't knows" volunteered that they "don't really care what happens over at Sperry."

There were 22 Doubting Thomases in the Burroughs base (22%) who disbelieve Mr. Blumenthal's promises even for the immediate future. "Why else would they have combined," they ask, if there was no intention of starting to combine architectures as well? Interestingly, none of the Burroughs respondents stated that combining architectures would be a bad idea, and several were pleased at the prospect of making their existing Burroughs and Sperry systems compatible.

The 75% of Sperry respondents who expect the disparate Burroughs and Sperry architectures both to be retained through 1991 represent a draw rather than a clear victory for the Burroughs publicity campaign. As with Burroughs users, many Sperry customers assume that the incompatible lines will be maintained that long only because it would take at least five years to combine them.

Like their peers at Burroughs, several Sperry users are sanguine about dismissing Mr. Blumenthal's promises, since anything easing incompatibility problems would be welcomed. However, most of the 16 expecting a changeover to begin before 1991 are dubious about Burroughs "propaganda." One respondent had letters from both Burroughs and Sperry guaranteeing continuation of the Sperry line; if the architectures are converged, he'll "see them in court."

User Acquisition Plans. The good news is that 98% and 97% of Burroughs and Sperry users report that the merger did not adversely change their acquisition plans. The bad news is that it didn't affect them positively either.

Burroughs sites report a decent acquisition rate as the transition to the company's new A-series continues. Thirteen sites report plans to acquire A10s,

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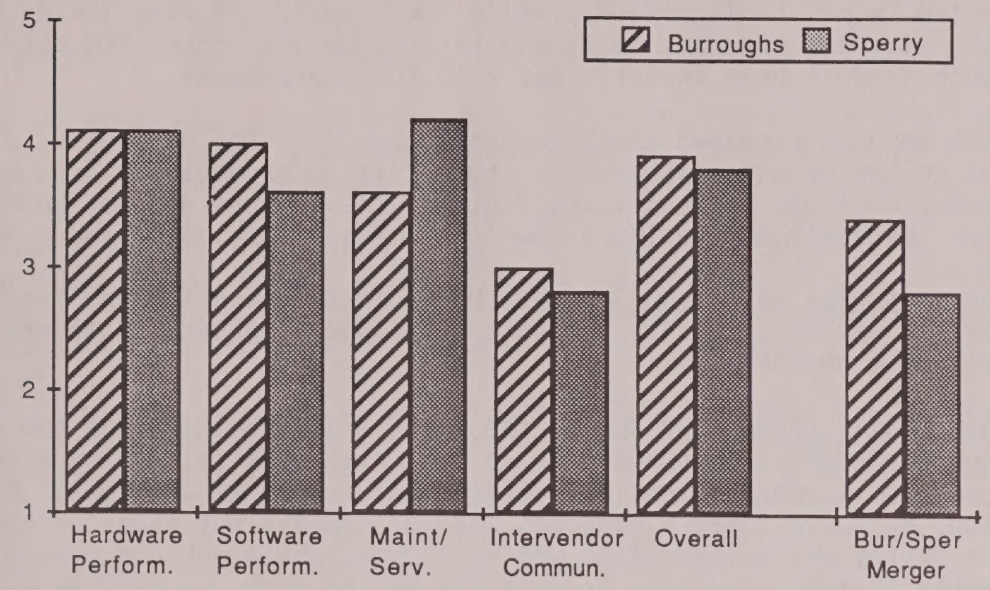
USER PERCEPTIONS OF SPERRY AND BURROUGHS LARGE- AND MEDIUM-SCALE SYSTEMS
(5 = EXCELLENT, 1 = POOR)
(Copyright 1986 -- International Data Corporation)



A12s, or A15s, which is comparable to the 16% of IBM sites (as of early June) definitely expecting to buy an IBM mainframe in 1986. The problem is that Burroughs users are just as apt to buy from other vendors. Nine plan to buy IBM mainframes in the next six months, while three will pick up Digital systems.

Already sites in the survey were heavily infiltrated by the two industry leaders (22% had IBM mainframes installed, while 7% had Digital systems). And it is towards them, particularly IBM, and towards service bureaus that the heavy leakage of Burroughs' installed base revealed by the survey is moving.

Sperry has been spared that particular problem (even if one site says there's a 50% chance they'll "dump the mainframe and go to Apollo"), but has troublesome ones of its own. Sperry sites in the survey plan to acquire only five IBM mainframes and one Digital supermini over the next six months, but they're not buying much from Sperry either. Only eight will buy 1100 series systems through next January.

Attitudes Towards Burroughs and Sperry. Users rank both Burroughs and Sperry fairly high overall, and fairly equal. On a scale of 1 to 5 (Poor to Excellent), the median score for Burroughs was 3.9, and for Sperry 3.8. This equivalence, however, masked some significant differences.

Not on hardware performance, though, no matter what Sperry users think. The two companies tied in this category with strong 4.1 ratings, despite the complaint from a portion of the Sperry base upset about the merger that Burroughs systems are "cheaply made," with "no backbone in the hardware."

But on software, yes. Burroughs users gave software performance a 4.0, while Sperry respondents averaged out at 3.6. Part of the Burroughs advantage is its range of application software for specific markets, but even some of the Sperry users feel that Burroughs has a distinct edge in making any software more user-friendly.

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And also on maintenance and service, where Sperry got its highest rating (4.1) and Burroughs one of its lowest (3.6). Despite much effort on Burroughs' part in recent years, this is still a sore point with many users, although some noted recent amelioration. While some Sperryites fear losing what they perceive as their superior service after the merger, other IDC surveys indicate that both vendors have recently had room for improvement.

Both vendors received their lowest scores (3.0 for Burroughs, 2.8 for Sperry) in the potentially crucial, but still underdeveloped area of intervendor communications. Around a third of all respondents did not answer this question, probably indicating a low level of existing intervendor networking.

Prospects for Burroughs/Sperry. Most of the attention has recently gone to specific issues raised by the Burroughs/Sperry merger. Some are just now approaching answerability:

What really transpired during the negotiations between the two companies? (The new Burroughs prospectus details how, after Sperry's talks with NCR in March and April, not to mention earlier discussions with Siemens, Phillips, and Ericsson, Burroughs' May 5 proposal led to involved but abortive negotiations between Sperry and Honeywell in which Honeywell held out for a swap of stock and assets -- i.e., Sperry's Aerospace & Marine Group -- and Sperry offered to purchase all shares of Honeywell common stock for $105 per share.)

What are they going to call their new creation? (For internal purposes they have apparently moved from Nova, which sounds like a car, to Nuco, which sounds like an automotive parts supplier. Nuco is what the Honeywell-GE combo was called before it became simply "Honeywell Information Systems.")

What happens to Sperry executives? (At the highest level Probst has given his answer, while Bob Kroger will hang around for a while as marketing czar, possibly to assess his chances vis-a-vis Burroughs-grown Paul Stern of succeeding Blumenthal. At the operational level, it's still anyone's guess.)

And it's anyone's guess on all the really crucial questions that won't be answered for several years, if then. What goes, what stays, and how much integration will or can occur as long as Burroughs' promise to maintain incompatible architectures is kept? How long will that be, given that Mr. Blumenthal can't speak for his successors? How much money can be saved without merging lines, and will it be enough to meet both Mr. Blumenthal's promises about financial returns and his promissory notes to fund the takeover?

Nevertheless, as intriguing and critical as these questions are, the key finding from IDC's QuikSurv survey of Burroughs and Sperry sites is that the merger is right now only a side issue. It has neither exacerbated nor resolved the fundamental questions facing the two companies singly or jointly.

In the context of survey results, Mr. Blumenthal's campaign to acquire Sperry looks less like an aggressive move against IBM and Digital than a defensive move to turn around a deteriorating situation. Whether this particular merger was necessary may have seemed less important than the need to take some action. The particular action taken seems to have been predicated on Mr. Blumenthal's hunch that gigantism is the homeopathic remedy for IBMitis. One can question whether comparative smallness was really Burroughs' main weakness; what can't be questioned is the gutsiness of Blumenthal's countermove.

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APOLLONIAN VS. DIONYSIAN WORKSTATIONS: MORE SUNUPMANSHIP

Life is often best viewed through bifocal lenses. Friedrich Nietzsche, for instance, divided the artistic impulse into two components, the Apollonian and the Dionysian, "just as procreation depends on the duality of the sexes, involving perpetual strife with only periodically intervening reconciliations."

In the world of engineering workstations, the dualities are best represented by Apollo and Sun. The respected pioneer in the market, Apollo set the original performance standards for workstation CPU speed, color graphics, and distributed processing through its Domain operating environment. Sun has been the low-cost alternative (its 3/50 lists at a base price of $7,900). It has utilized diskless workstations, off-the-shelf components, an open operating system (4.2 BSD Unix), and a Unix-derived networking scheme (NFS) allowing easy communication among heterogeneous vendors that now sports over 80 licensees.

Nevertheless, the strategies of the two vendors are starting to converge. Over the past two years Apollo has adopted diskless network nodes, a dual-port (4.2 and System V) Unix offering in lieu of its proprietary Aegis operating system, and a three-tier product line with low-end entries competing directly against Sun and PCs. On August 5, Sun responded to Apollo's dominance of the high end for workstation performance and graphics capabilities.

High noon for Sun is its new 3/200 series of workstations based on the 25MHz 68020 and the 20MHz 68881 floating point coprocessor, which allegedly allow Sun to break a different kind of record as the first vendor to offer 4 MIPS and 125 single-precision Kflops in workstation mode. The monochrome version nearly doubles the resolution of previous Sun models to two million pixels (1,600 X 1,200), although the color and grayscale models retain 1,152 X 900 pixel resolution. Base price for the diskless 3/200 workstation is $33,900.

Sun also addressed its low-end color shortcomings with the 3/110 color workstation, which offers 1,152 X 900 pixel resolution and twice the number of color planes (eight vs. four) as the comparable Apollo models. At $15,900 for the diskless entry-level workstation, it rounds off Sun's own three-tiered line: the 3/50 series, which use 15MHz 68020 processors and are rated at 1.5 MIPS; the 3/100 series, utilizing 16.67MHz 68020s for 2 MIPS, plus 16.67MHz 68881s; and the new 3/200 series, with 25MHz (4 MIPS) 68020s and 20MHz 68881s.

Sun also took the opportunity to introduce the first phase of its alliance with AT&T, announced in September 1985, to converge 4.2 BSD with System V. It is obviously in Sun's interest not to get locked into 4.2 BSD as the rest of the workstation industry standardizes on V, and in AT&T's to propagate a single Unix standard without orphaning Berkeley buffs. On August 5 Sun unveiled a release of its operating system that merges V functionality with its 4.2-based kernel, libraries, and utilities. It does not quite meet the System V Interface Definition Base Level specifications, but these holes will be filled in the next phase, scheduled for the second half of 1987.

Meanwhile Apollo, playing to a historic strength, announced on August 13 high-end color workstations which also employ optimized 68020 and 68881 processors and have higher resolution and better 3-D and 2-D capabilities than Sun's color 3/200 workstation. Before the quarter is over, Apollo very likely will announce a new high-end product that even more clearly positions it back on top. And the beat goes on.

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• MORE STOPS ON THE VAXBI BUS LINE. Besides finally announcing all-VAXBI 8200 and 8300 systems that don't need to double their floor space with Unibus adapters, Digital has come up with two new VAXBI systems at the same performance level as the Unibus-only 8650. The chief difference between the two new kids is that the 8550 is an upgrade from the 8500, while the 8700 is an upgrade path to the 8800. The 8650's only remaining selling points are Unibus and Ultrix, but neither seems compelling. Since most 8600s and 8650s are on VAX-Clusters, there will typically be other, less costly ways of yoking that performance level (circa 6.5 MIPS) to existing Unibus peripherals, and it should be fairly trivial to soon offer Ultrix on at least the 8550. Hence, although some VAX systems seem to get a second wind after Digital announces a new generation, the Gray Sheet does not expect many new sales for the 8600 or 8650.

• CRAY ARRAY. By speeding up the clock from 9.5 to 8.5 nanoseconds, Cray is claiming a performance improvement of 12% in the X-MP line. Also, two new X-MP models increase buyer options: the Model 44 has four CPUs like the 48 but half the memory size for $2 million less, while the 22 has the same relation to the two-CPU 24, for $1 million less. Moreover, a million bucks have been shaved off all low-to-midrange X-MPs (i.e., one- and two-processor systems with MOS rather than ECL bipolar memory) except Models 24 and 28, which are $500,000 cheaper. There are now 11 X-MP models ranging from $4 to $16 million.

• FLOATING POINT FACES FRONT AMID LOSSES. Floating Point Systems has eschewed its usual backend approach to scientific/engineering computing with its "first independent minisupercomputers" and an entry-level frontend delivering six megaflops for under $100,000. Latest prerelease figures from FPS for the quarter ending July 31 project a $2-3 million loss.

• HP ADDS TO NON-PRECISION-ARCHITECTURE SPECTRUM. To keep appetites whetted until more Precision Architecture 3000 Series systems are available, Hewlett-Packard has taken the processor from the 3000/58 and fashioned a new midrange system between the 3000/42 and /58 for $45,000. HP's revenue for the quarter ending July 31 was up 11%, but in the critical category including computer sales rose only 1%; still, orders in that category were up 26% over a year ago, reflecting both a rebound from weak international sales in 1985 and the first meaningful rise in U.S. orders in two years.

• PCM ACTION: NAS. NAS has been shipping its AS/XL line since June but only got around to saying so in late July. In early August it unveiled vector processors for the AS/XL series that function as a superset of the earlier 91XX line and will offer object code portability with the 3090 VF (necessary since NAS must piggyback wide commercial acceptance of vector processing on the success of IBM's entry). Pricing varies from $3.6 to $14.2 million, depending on which AS/XL system the vector processors will be attached to.

• PCM ACTION: AMDAHL. Meanwhile Amdahl announced that it, too, shipped the current head of its Sierra class in June. It has also revealed that 5890-300 performance is really 1.8-2.1 times a 5870 rather than just 1.7-1.9.

• TANDEM LOOKS LOW. The NonStop EXT10 from Tandem allows a user to start with 4.3 ET1 transactions per second for $82,500 and expand to 8.6 TPS. Tandem has also introduced the EXT25, a new 11-TPS midrange system.

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THE GRAY SHEET
Computer Industry
REPORT

D.C.BELLOMY, EDITOR July 31, 1986 • VOL.22, NO.7 P.J.MCGOVERN, PUBLISHER

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THE COMPUTER RALLY STILL DALLIES

A bedside visit to the vendors whose financial results the Gray Sheet is tracking this year indicates that the industry's pulse is beating stronger, but the patient isn't ready to be discharged any time soon.

Because three firms on the list (Altos, ADP, and StorageTek) won't announce results until mid-to-late August, and a fourth (Tandy) is holding off on an earnings statement until then, some adjustments have to be made to the samples before comparing results. However, the question of the computer industry's health at the midpoint of 1986 is too important to wait another month.

The second quarter was a distinct improvement over the first. Revenue for the adjusted sample was up 11.5% on a quarter-to-quarter basis, compared to the 7.8% rise registered last year as the Great Softness settled in. As a result, the adjusted sample showed an 8.7% revenue rise from 2Q1985. This is hardly heady growth when compared to earlier years in the decade, but it beats the 5.0% growth displayed by the same vendors during the first quarter.

Moreover, the 2Q revenue gains generated some positive movement in the earnings column as well. Overall, the companies' bottom lines improved 16.7% over 2Q1985, compared to an 8.5% drop in the first quarter; of course, part of this trend simply represented lower loss levels (e.g., Computervision and DG).

Counterbalancing one another's contributions to the quarterly totals were the two market leaders. Without IBM's troublesome numbers, the sample's revenue growth would have been closer to 10% (9.8% to be exact), and the earnings total would have more than doubled. Without Digital's stellar showing, revenue growth would have been down at the 8.1% level. But if you took out both burgeoning Digital and stagnating IBM, the revenue growth for the rest of the sample would be 8.8% -- right back where it started from.

Among vendors with a significant position in the large-scale systems market, only a couple had demonstrably strong quarters. Burroughs' quarter represented a long-awaited turnaround. According to Mike Blumenthal, "Our U.S. computer operations generated double-digit order and revenue growth[,] recording the best performance since the fourth quarter of 1984." Even Memorex eked out a small profit. Also, NAS is starting to show the effects of the AS/XL series, as May orders hit an all-time high.

Cray is still going great guns, although its revenue growth is heavily dependent on its sales/lease mix. Based on current orders, Cray expects to ship as many systems in the second half as in the first, but because a larger proportion will be on lease, revenue growth will not maintain the same pace.

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Other mainframe vendors have not been so fortunate. IBM's situation was evaluated last issue (Vol. 22, No. 6). Amdahl is in a holding pattern until at least the fourth quarter, and then must hope that its lower prices will lure possible Sierra-class users who have so far balked at adding the potential for higher performance in IBM's 3090 series.

In what remains of the Bunch, CDC mainframe business is still a Lazarus awaiting a visitor to the tomb, while Honeywell's corporate revenue growth masked a sharp decline in Information Systems operating profit. U.S. computer orders were up from the first quarter, but down from last year.

What growth Sperry registered was in defense and aerospace, since commercial computer revenue fell 12% from 2Q1985, and orders dropped 19%. Part of this decline can be attributed, in Sperry's words, to "the continuing weakness in the computer industry," and to a winding down of the favorable product cycles that partially protected it from the Great Softness last year. Another part, though, may be related to user wariness in the wake of the merger with Burroughs; results of a new IDC survey of Burroughs and Sperry sites will be discussed in the next issue of the Gray Sheet.

As the size class diminishes, the situation brightens. Digital's overall level of success is exceptional, but Data General climbed 14% over 2Q1985, and Prime jumped 14.5%. Tandem continued to regain momentum, while the Stratus sphere/stratosphere pun needs no elaboration. Tandem's James Treybig reports that, "For the first time in more than a year, the U.S. showed significant improvement." Prime's Joe Henson notes that during the second half of June "we experienced a surge in orders which we were unable to ship before the close of the fiscal quarter," which bodes well for 3Q revenue.

How well, no one knows. As Henson adds, "It is not clear whether the increased demand is a short-term phenomenon or the beginning of a long-term improvement in our business." This holds true throughout the midscale market. A gnawing suspicion nags that the second quarter represented another false dawn in this sector. Moreover, circumstantial evidence suggests that a disproportionate percentage of Digital's 1986 revenue rise has been at the MicroVAX II/small-scale systems level. If this trend holds throughout the mini/supermini field, it would prevent overall profits from keeping pace with revenue growth.

Among technical workstation vendors, Apollo feels that it is finally climbing out of the morass with word that orders for its new products began to accelerate in June. However, it can't feel very serene as Sun's shadow gains on it. The differential in quarterly earnings can be partially explained by Sun's decision to frontload expenses in the first half of its fiscal year so that it could wind up with a flourish. More ominous for Apollo is the fact that Sun's revenue for the quarter came to 87% of Apollo's quarterly total. A near-equal now, Sun is no longer simply an upstart startup.

Among PC vendors, Apple finally had a strong quarter in revenue as well as earnings, but the biggest revenue jumps occurred for the most part among IBM-compatible systems not represented on the list. IBM's frantic repricing is one indication that it is not among that select group.

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SELECTED INFORMATION INDUSTRY FINANCIAL RESULTS, SECOND QUARTER 1986
(Source: Company Financial Reports)

Company*	2Q 1986 Revenue $M	2Q 1985 Revenue $M	% Change	2Q 1986 Earnings $M	2Q 1985 Earnings $M	% Change
Amdahl	209.3	206.2	+1.5	2.7	5.2	-47.8
Apollo	88.4	87.5	+1.0	1.0	7.4	-85.9
Apple	448.3	374.9	+19.6	32.3	(17.2)	-
Ask Computer Sys	26.6	20.8	+28.1	2.0	2.3	-14.3
Britton Lee	7.4	8.1	-7.9	(.3)	1.1	-
Burroughs*	1,340.0	1,230.0	+8.9	76.2	54.1	+40.9
Cipher Data	50.6	36.0	+40.6	3.8	2.0	+91.5
Comdisco	224.5	149.3	+50.3	19.8	18.0	+9.7
Compaq	147.1	118.9	+23.8	9.6	3.5	+69.5
CCI	33.1	35.1	-5.7	(.9)	(4.6)	-
Computervision	119.3	112.3	+6.3	(3.4)	(19.5)	-
CDC w/o ComCrdt	828.5	913.3	-9.3	(20.3)	(16.0)	-
Convergent Tech	58.1	101.1	-42.6	(5.1)	2.5	-
Cray	179.9	77.3	+132.8	44.5	13.6	+226.1
Data General	325.3	285.5	+13.9	(2.0)	(8.3)	-
Digital	2,175.6	1,851.9	+17.5	238.6	100.4	+137.6
Gould	321.3	355.9	-9.7	4.3	(144.7)	-
Honeywell	1,730.4	1,547.3	+11.8	36.1	52.5	-31.2
Intel	305.2	360.0	-15.2	(20.4)	9.2	-
Intergraph	150.4	130.6	+15.2	17.3	16.7	+3.6
IBM	12,268.0	11,434.0	+7.3	1,305.0	1,414.0	-7.7
Lotus	66.2	59.3	+11.7	11.8	10.7	+10.0
MSA	47.6	38.1	+24.8	5.9	3.1	+93.8
Mentor	42.1	33.5	+25.8	2.3	1.8	+22.8
Microsoft	62.0	36.9	+67.8	11.5	5.6	+105.2
Miniscribe	43.7	26.0	+68.5	5.6	(7.1)	-
National Semi	397.8	428.6	-7.2	(7.1)	(2.7)	-
NBI	73.5	64.9	+13.3	(2.8)	2.6	-
NCR	1,168.8	1,031.6	+13.3	78.8	66.7	+18.3
Priam	28.5	24.9	+14.5	(4.5)	(7.1)	-
Prime	210.5	187.3	+12.4	11.4	13.1	-13.1
Seagate	141.5	71.8	+97.1	16.4	.7	+2204.6
Sperry*	1,255.4	1,233.4	+1.8	6.8	51.5	-86.8
Stratus	30.2	18.6	+62.5	3.3	1.9	+74.1
Sun	76.7	37.3	+105.6	5.9	2.1	+181.0
Tandem	200.9	144.2	+39.3	18.1	2.4	+659.0
Tandy*	748.5	652.1	+14.8			
TI	1,240.0	1,240.0	-	12.3	(3.9)	-
Ungermann-Bass	22.7	18.7	+21.4	(3.9)	1.3	-
Wang	716.8	635.2	+12.8	.8	(109.0)	-
Wyse*	52.6	36.9	+42.5	4.0	2.2	+84.3
Xerox	2,300.0	2,100.0	+9.5	122.0	220.0	-44.5
Sample Total	29,963.3	27,555.3	+8.7	2,039.4	1,748.1	+16.7

*Not including Altos, ADP, and StorageTek from the 1Q list; Burroughs 2Q1985 net after $5.3M gain from sale of forms division; Sperry 2Q net after deducting $73.0M for the Burroughs merger; Tandy 2Q earnings to be released mid-August; Wyse 2Q results include acquisition of Amdek.

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SELECTED INFORMATION INDUSTRY FINANCIAL RESULTS, FIRST HALF 1986
(Source: Company Financial Reports)

Company	1Hlf 1986 Revenue $M	1Hlf 1985 Revenue $M	% Change	1Hlf 1986 Earnings $M	1Hlf 1985 Earnings $M	% Change
Amdahl	409.6	383.7	+6.7	5.1	9.3	-44.9
Apollo	170.4	169.7	+.4	1.6	16.2	-90.3
Apple	857.2	810.2	+5.8	64.1	(7.2)	-
Ask Computer Sys	44.2	40.0	+10.5	3.4	4.1	-17.1
Britton Lee	14.7	14.6	+.5	(.1)	2.1	-
Burroughs	2,480.0	2,390.0	+3.8	92.2	100.7	-8.4
Cipher Data	90.8	80.4	+13.0	5.5	6.3	-11.6
Comdisco	451.6	287.3	+57.2	36.2	26.2	+38.2
Compaq	291.1	215.9	+34.9	18.0	10.3	+74.1
CCI	54.3	61.1	-11.1	(6.5)	(10.1)	-
Computervision	232.3	218.2	+6.5	(10.4)	(38.3)	-
CDC w/o ComCrdt	1,624.6	1,803.8	-9.9	(62.9)	(27.5)	-
Convergent Tech	131.6	193.7	-32.1	(3.2)	2.6	-
Cray	321.9	195.3	+64.3	75.4	44.5	+69.4
Data General	644.1	605.7	+6.3	(3.8)	.8	-
Digital	4,104.0	3,543.0	+15.8	409.0	192.1	+112.9
Gould*	662.9	704.3	-5.9	(110.8)	(126.6)	-
Honeywell	3,232.4	3,027.3	+6.8	62.3	98.7	-36.9
Intel	585.2	735.3	-20.4	(42.5)	20.1	-
Intergraph	297.4	239.5	+24.2	35.3	31.1	+13.7
IBM	22,395.0	21,203.0	+5.6	2,322.0	2,400.0	-3.2
Lotus	135.5	104.0	+30.3	23.2	20.4	+13.8
MSA	77.0	63.1	+22.0	5.5	.3	+1516.1
Mentor	79.2	65.8	+20.3	4.2	4.9	-15.2
Microsoft	112.5	77.6	+45.0	22.1	14.1	+56.7
Miniscribe	84.1	49.8	+68.7	10.3	(19.6)	-
National Semi	726.7	823.1	-11.7	(39.1)	(1.2)	-
NBI	141.1	119.5	+18.1	(5.1)	6.6	-
NCR	2,129.6	1,874.3	+13.6	129.1	110.3	+17.1
Priam	64.6	54.0	+19.6	(2.0)	(11.9)	-
Prime	407.4	363.1	+12.2	20.7	25.1	-17.6
Seagate	268.5	112.2	+112.2	28.2	2.4	+1075.0
Sperry	3,056.5	2,820.6	+9.0	122.1	157.4	-22.4
Stratus	57.1	33.8	+69.1	6.3	3.4	+85.4
Sun	134.3	71.2	+88.6	9.3	5.4	+72.2
Tandem	377.2	290.7	+29.8	30.5	9.2	+231.5
Tandy*	1,515.3	1,332.4	+13.7			
TI	2,390.0	2,520.0	-5.2	(11.5)	5.2	-
Ungermann-Bass	48.8	30.6	+59.4	(3.1)	.8	-
Wang	1,375.1	1,187.9	+15.8	22.2	(91.6)	-
Wyse	98.9	72.2	+36.9	7.7	3.8	+104.2
Xerox	4,300.0	4,100.0	+4.9	223.0	334.0	-33.2
Sample Total	56,674.7	53,087.9	+6.8	3,493.2	3,334.4	+4.8

*Not including Altos, ADP, or StorageTek revenue and earnings, or Tandy earnings; Gould figure includes belated restatement of 1Q results to reflect charge for future defense losses.

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Compaq's continued success is thus all the more remarkable. The official line is that Compaq remains relatively impervious to the commoditization of compatible PCs and to the decision of retail chains to add low-cost dealer-labeled clones. Compaq estimates that in 2Q1986 cheap compatibles accounted for 5.8% of independent dealer revenue, compared to 22% for Compaq products. Nevertheless, Compaq no longer has a clear edge in functionality over cheaper products, and must now compete for sales commissions with dealers' own lines. Financial types still rave about Compaq's hefty profit margins, but 2Q revenue growth, while undeniably strong, was starting to level off at 23.8%, compared to 48.4%, 38.7%, 50.5%, 80.3%, and 54.3% in the five preceding quarters.

The key question, of course, is not how well particular vendors did in the most recent quarter, but how the year is shaping up. At the halfway point, the sample's overall revenue grew 6.8% over the first half of 1985, while the earnings column registered 4.8% growth. Without IBM, revenue would have been up 7.5%; without Digital, it would have been up 6.1%; without both, 6.5%.

At that rate, what is the chance that the vendor sample could match over the whole of 1986 the 8.9% growth registered in 1985 by the somewhat different sample used by the Gray Sheet last year (see Vol. 21, No. 20, February 19, 1986)? At this point, not much. In fact, it now looks like the growth rate at the end of the year won't look as good as the pace at the midfield marker.

Results for the third quarter, historically a weak season for computer sales, may show comparable or stronger growth than the second quarter, but will probably not have a major effect on total 1986 revenue growth. Third-quarter growth will certainly not be able to compensate for the lower growth rates that seem almost inevitable in the fourth quarter.

Last year's growth rode hard on 4Q results, with IBM up 18.4%, Digital up 14.4%, Honeywell up 15.9%, Prime up 22.9%, and so forth. Some of these vendors (e.g., Digital) could repeat their 1985 performance, while others, including Apple, could better it. But at this point it doesn't appear that they could compensate for the vendors who will probably fall short. In particular, it seems unlikely that the 3090-400 can do for IBM at the end of this year what the 3090-200 and new 3380s did for it last year.

In short, the Great Softness still drags on, and will likely continue through the rest of 1986. Reports of higher orders at the end of the second quarter are heartening, but like Macbeth's Weird Sisters may offer misleadingly optimistic counsel. Like Macbeth, vendors may finally exclaim, "And be these juggling fiends no more believ'd, / That palter with us in a double sense: / That keep the word of promise to our ear / And break it to our hope."

THE GREAT SOFTNESS CHECKLIST

IDC has recently compiled an overview of possible explanations of the slow growth pattern in the computer industry. Least convincing in these halls are claims of top management skepticism about acquisitions, market saturation at a time when only about 40% of the U.S. work force uses a CRT or PC, or commoditization outside of the PC sector. Of some but limited moment are the sluggish economy and "downsizing." More significant are system incompatibilities, the invisible application backlog, disequilibria between what users supply and what users at this point demand, and the lag in computer literacy. Unfortunately, these factors won't disappear any time soon.

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WORLDWIDE PC CAD/CAE MARKET SHARE OF U.S. SOFTWARE VENDORS, 1985
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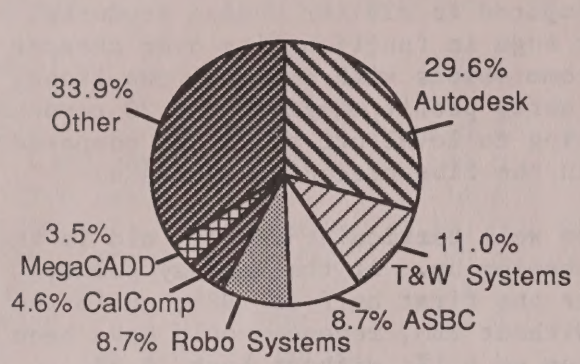
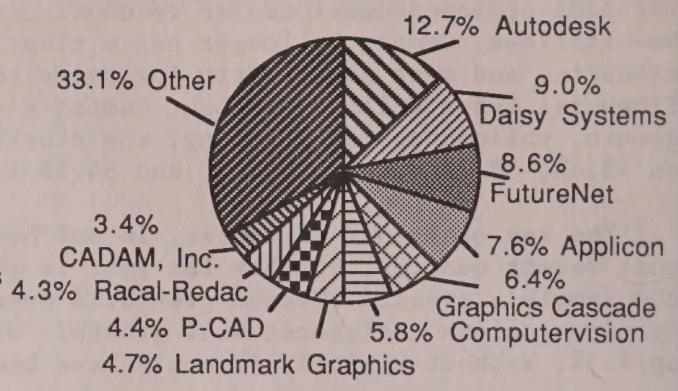


86,220 Units



$232.9 Million

TOMORROW'S TEST CASE: PC CAD DANCING TO THE "DOWNSIZING" ACCORDION

Validating the impact of relatively inexpensive PC CAD/CAE options, on July 24 IBM, the market leader in mainframe-based CAD applications, announced CADwrite, a full-function entry-level Computer-Aided Design and Drafting (CADD) PC-DOS program. It will be available in August at the aggressive price of $1,995.

The PC CAD market has come a long way since Autodesk introduced its pioneering AutoCAD package in November 1982. Still number one, AutoCAD accumulated 56,000 sales by the end of July. Some 300 software developers have developed complementary applications, and its first trade show in June garnered 5,000 preregistrations. But the market it stimulated has grown even faster:

- By the end of 1985 AutoCAD installations represented less than 30% of the total PC CAD/CAE installed base of 131,300.
- Almost two-thirds of this base -- over 86,000 software packages -- were shipped in 1985.
- The value of PC CAD/CAE shipments rose from $5 million in 1982 to $232.9 million in 1985, a compound annual growth rate of 281%.
- Over two-thirds of all CAD/CAE packages in use today are running on PCs (not counting 32-bit engineering workstations).
- Midscale-oriented CAD vendors like Computervision, Intergraph, and McDonnell Douglas are rushing to downsize their software for PCs.

The market has attracted some 120 players with offerings across a wide swath of possible applications, including even compute-intensive work like solid modeling. However, the top ten vendors account for over three-fourths of the installed base. Many of the revenue leaders bundle hardware with their packages, but almost everyone else leaves PC sales to dealers and distributors.

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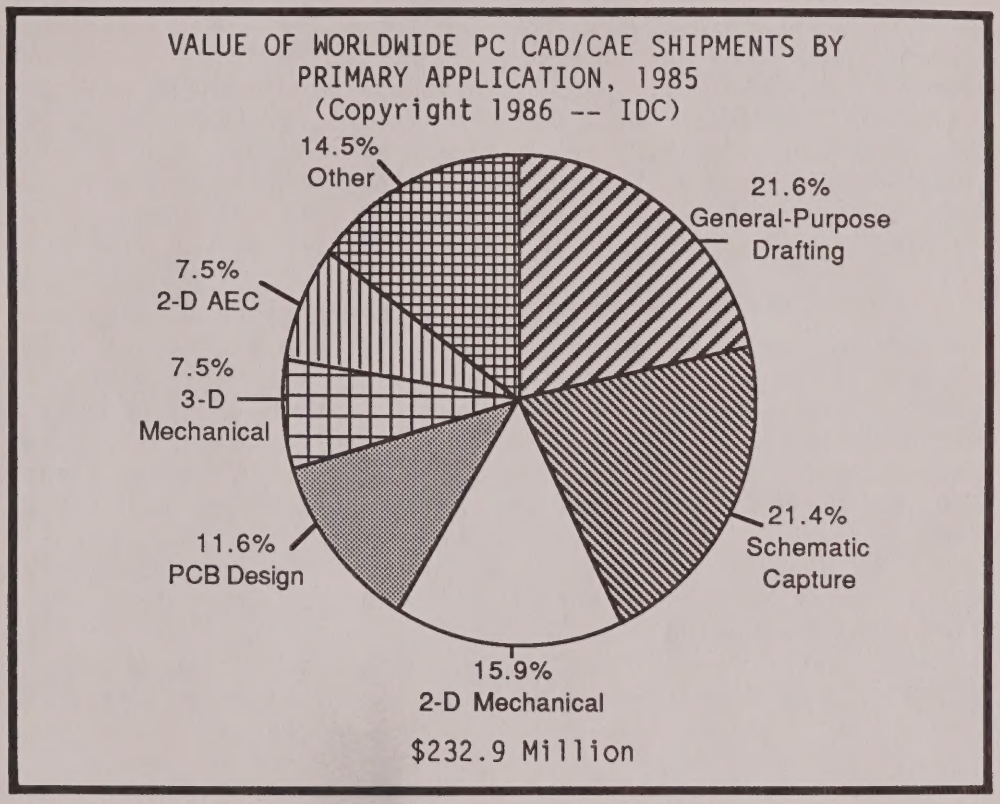
There is a distinct trend away from general-purpose drafting packages from vendors like Autodesk and T&W Systems towards more specialized applications. Part of this move stems from vendor self-interest, since increased competition has led to sharp pricing pressure at the low end. Part, too, derives from user demand, since customers weaned on successful packages like AutoCAD are now looking to do more advanced CAD work with the PCs on their desks.

Nevertheless, in this success lurk dangers that make the long-term future of the PC CAD/CAE market difficult to forecast. Downsizing has developed a wider market for CAD/CAE applications among users who are now often contemplating upsizing as they start topping out on AT performance.



The most cost-efficient alternative would be engineering workstations. In an eight-person workgroup, equipping everyone with ATs still costs only about half what it would take for a Sun network with equivalent software. However, Sun, Apollo, et al. offer superior performance and networking -- but in Unix, not PC-DOS.

It could be significant that some of the leading workstation vendors are building ties to DOS. Although Apollo's Phoenix-designed AT coprocessor board won't ship until the fourth quarter, IBM's AT coprocessor for the RT is available now, while Sun's IPC, a 10MHz 80286 coprocessor board allowing MS-DOS applications to run as a window under Unix, is slated for late third-quarter delivery. Perhaps even more importantly, Sun has introduced PC-NFS, which offers transparent file access among IBM-compatible PCs, Sun workstations, and other computers using the NFS de facto standard.

Moreover, the Unix/DOS equation will soon be thoroughly smudged with the advent of 80386 systems. Not only will the new systems solve many of the performance problems for the more sophisticated PC CAD applications, but they will also offer coresident Unix and MS-DOS operating systems.

Yet the question remains: once users have the realistic option of upsizing their CAD/CAE applications on Unix workstations, how crucial will the DOS-based PC CAD market continue to be except for the crowded, low-margin low end? IDC currently projects a 19.4% annual rise in unit PC CAD shipments through 1990 and a 16.1% growth rate for revenue, but the jury is still out.

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• CHIP WAR TRUCE. It looked suspiciously like a desert, but they decided to call it peace. Japanese and U.S. negotiators agreed on a vaguely worded statement, with informal "understandings" attached, to suspend retaliatory restrictions on Japanese chip imports (although the antidumping duties on 64K chips will remain in effect). The three major provisions are: (1) Both countries will try to police the market to prevent future dumping. (2) Japan will provide U.S. and other foreign semiconductor companies with Japanese manufacturing facilities with the same benefits (R&D grants, tax breaks, etc.) given domestic manufacturers. (3) The Japanese government will help create "a steady increase" in market share for foreign chip manufacturers. The unofficial promise is a rise from 8.2% to more than 20% by 1991, but official quotas don't sit well with either government (and besides, unofficial promises that are impossible to keep are more gently broken than official ones). Vendors in both countries are queasy, but everyone is publicly satisfied. That's progress.

• DATA GENERAL MANEUVERS. Even though it is finally beginning to see some forward momentum, Data General is still in a precarious position. On July 29 it made three moves. First, it announced the Eclipse MV/7800, the first new-generation product to fill the huge performance gap between the MV/2000 and MV/20000. Citing S/36 Model 5360 and the VAX 8200 as typical competitors, DG tags single-board 7800 performance as equivalent to an eight-board MV/8000. The central electronic complex with 4MB of memory goes for $27,550; average cost per user of a fully configured system over five years is estimated at under $2,000 p.a. Second, it announced price increases averaging 6% on older models (primarily those announced before February 1985) and 10% on software licenses. And third, it sought to increase its customer base by going after an even weaker competitor: it launched a marketing program to lure Datapoint users with software modules allowing application programs written in Datapoint's Databus language to run on Eclipse/MV systems with minimal recoding.

• PHOENIX STANDARDS. The ad hoc group initiated by Phoenix Technologies to create a bus architecture for the 80386 has formally organized as the Personal Computer Extended Technology (PCET) Standards Committee and expanded its jurisdiction to include codifying the 16-bit AT bus before providing 32-bit extension specs. Both will supposedly be ready by September 1. Meanwhile Phoenix officially announced that in April it released its AT-compatible ROM BIOS for the 80386 and has shipped it to 15 designers of future 386 products.

• NO MORE BUNCH TAKEOVERS. NCR has followed Honeywell's lead from back in February by adopting a stock purchase rights distribution plan to deter coercive takeover attempts. CDC probably needn't worry for awhile.

• CDC OFFERING COMPLETED. Control Data closed its $350 million long-term debt offering on July 31 and repaid $315 million of its short-term bank debt.

• FUJITSU'S YEAR. Because of its minimal direct presence in the U.S. computer market, Fujitsu escaped the Great Softness with a 16.6% rise in computer sales for the fiscal year that ended March 31 ($5.3 billion, calculated at 180 yen to the dollar). But as a semiconductor manufacturer it was a full participant in the worldwide slump, as sales slipped 26.6% to $1.25 billion. Overall revenue rose 8.3% to $9.4 billion, while net earnings plummeted 56.3% to $216 million. Total exports fell 4.7%, to $2.2 billion.

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THE GRAY SHEET
Computer Industry REPORT

D.C.BELLOMY, EDITOR July 23, 1986 • VOL.22, NO.6 P.J.MCGOVERN, PUBLISHER

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SIERRA AND THE SLUMP: MORE MIPS CAUSE MOPING IN ARMONK

Securely or solidly fixed in place -- not loose. Not easily moved, shaken, excited, or disturbed, hence by analogy not fickle or vacillating. Not weak, wavering, or uncertain, ergo solid, robust, sound, healthy. Not flabby or soft, but evidencing a solid or compact structure. Fixed, settled, definite, not subject to change, revision, or withdrawal. Steady, not subject to price weakness on an increase in offerings. That is how Webster's defines "firm." But what does John Akers mean by the word when he says "demand for large processors and storage devices is firm"?

Mr. Akers' comment occurred in the context of his official explication of second-quarter financial results. Because hardware sales were up only 6.6% over 2Q1985, gross income rose a less than robust 7.3%. When coupled with first-quarter results, the most recent figures add up to a 3.6% expansion in hardware sales and 5.6% growth in revenue. About the only good news was that hardware sales revenue was up 34.1% from the first quarter.

What really caused a stampede of financial analysts to their word processing programs to revise their recommendations, and investors to their portfolio programs to sell off IBM stock, was the earnings column. A drop of 7.7% for the quarter brought first half profits down 3.2%. Even worse, earnings before income taxes were off 14.9% for the quarter, and 7.4% for the half.

Worse still, the worst is probably still to come. Akers admitted that, barring "an improvement in capital spending in North America, it will be difficult to show earnings growth in 1986," which may understate the problem. Although shipments of the 3090-400 will help IBM round off 1986, it is implausible that the 400 could account for anything near the 18.4% rise in revenue or 23.4% earnings growth to which the 200 and double-density 3380s contributed in the fourth quarter of 1985. Under the circumstances, IBM should count itself lucky if it escapes with a flat 1986.

In that gray a landscape, the statement about processors and mainframe storage looked comparatively rosy. Yet the word "firm" seems to lack the resonance of adjectives chosen in earlier reports for other products -- words like "strong," let alone "record." And firm compared to what IBM projected, hoped for, or would realistically settle for given the unfavorable climate?

Data from a survey conducted in late May and early June by IDC of IBM mainframe sites in the United States suggests that the third, least favorable interpretation is the most accurate. The responses indicate that the mainframe market may be weak for all the macroeconomic reasons cited by Akers, but the bottom line right now is that users aren't convinced they need what the 3090 series offers them in additional performance.

IDC INTERNATIONAL DATA CORPORATION
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A total of 500 sites were contacted, and the results were then projected to the overall U.S. market. Among the most significant findings were that:

- Despite full-year availability of the 3090-200, and part-year for three additional models (the 150, 180, and 400), U.S. shipments of IBM large-scale systems in 1986 will be in a range averaging only about 10-11% above the unit total achieved during the mainframe transition year of 1985. Shipments will be about even with the 1983 pace, far short of the 1984 record.

- Sales of the 200 seem to have already absorbed most of the ready demand for systems in that niche. Shipments in 1986 will be only a little better than the fourth-quarter 1985 total. U.S. 3090-200 unit shipments by the end of 1986 will likely be somewhat below the number of shipments of the 3081, its counterpart in the previous mainframe generation, during a comparable initiation period.

- Since 3090-200 units will be flat compared to last year, revenue after 1986 price cuts will be somewhat down; moreover, since 3084 shipments will be virtually nil in 1986, total revenue for the 3084/3090-200 performance level will be significantly lower.

- When the 400s emerge in the second half of 1986, IBM can expect less than half of the revenue boost that the 200s supplied last year, since only about a quarter as many will be shipped in the U.S., pre-release price cuts have trimmed potential income, and a portion of 400 shipments will be upgrades from 200s.

- IBM's hopes for 1986 mainframe growth must rest to a great degree on the 3090 uniprocessors, since 450-520 shipments of the 150 and 180 will more than compensate for the shortfall of 220 fewer 3083s.

- The net result for IBM will be, at best, 0-5% revenue growth for its U.S. mainframe CPU business.

- Around half of 308X acquisitions in 1986 will be used systems. Users are moving away from purchasing their systems, with the majority of planned acquisitions slotted to be leased through third parties or IBM Credit Corporation.

Obviously these results are crucial testimony on IBM's prospects for the rest of 1986, but of even greater significance, for IBM and other mainframers, are the reasons why demand for Sierras is so low. When the 75% of respondents to the sample who did not plan to acquire a 3090, 308X, or compatible system in 1986 were asked how come, only 9% of the naysayers said they really needed more mainframe MIPS power but had to forego it due to budgetary restraints.

Even farther down the list were other considerations. Fewer than 1% were choosing to invest instead in smaller, distributed systems; 6% were enhancing their installed base in lieu of acquiring additional mainframes; and 5% were still assessing their future mainframe CPU requirements.

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U.S. UNIT SHIPMENTS, IBM LARGE-SCALE SYSTEMS, 1981-1987
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Model	1981	1982	1983	1984	1985	1986	1987
303X	260	180	-	-	-	-	-
3081	120	840	440	300	120	90	20
3083	-	-	850	1,100	380	160	20
3084	-	-	10	200	260	20	5
3090-200	-	-	-	-	400	405-455	300
3090-180/150	-	-	-	-	-	450-520	950
3090-400	-	-	-	-	-	90-110	180
Total	380	1,020	1,300	1,600	1,160	1,215-1,355	1,475
% Change		+168%	+27%	+23%	-28%	+5-17%	9-21%

In sharp contrast to these relatively paltry numbers, over 80% were declining to acquire Sierra-class systems because they already had sufficient mainframe power for the next twelve months.

It's a matter of ullage, which is one of those names for things you didn't realize had a name. To return to Webster's, ullage is the amount that a container lacks of being full. What the survey responses show is that there is a lot less MIPS ullage in mainframes than large-scale systems vendors would like.

Life is seldom as clear-cut as a multiple choice question allows. In this case, other factors, including the roads not taken among the choices offered on the survey, probably contributed to users' perceptions that they don't need more MIPS in the near future. For example, even if they are not consciously choosing to shift spending to distributed midrange systems, "downsizing" -- the seepage of processing to smaller systems, including PCs -- has conceivably started to color attitudes about mainframe performance requirements.

Even more plausibly, budget restraints are probably forcing MIS managers to gauge performance requirements more closely and question whether they really

U.S. UNITS INSTALLED, IBM LARGE-SCALE SYSTEMS, 1981-1987
(Copyright 1986: International Data Corporation)

Model	1981	1982	1983	1984	1985	1986*	1987
370-158/168	2,270	1,800	1,260	860	530	360	240
303X	2,600	2,420	2,170	1,750	1,350	970	650
3081	120	960	1,400	1,700	1,820	1,880	1,900
3083	-	-	850	1,950	2,330	2,490	2,510
3084	-	-	10	210	470	490	495
3090-200	-	-	-	-	400	830	1,130
3090-180/150	-	-	-	-	-	490	1,440
3090-400	-	-	-	-	-	100	280
Total	4,990	5,180	5,680	6,470	6,900	7,610	8,645
% Change		4%	10%	14%	7%	10%	14%

*Midpoints of shipment estimate ranges have been used in calculating installed base estimates.

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need those extra MIPS right now. During the week of IBM's 2Q announcement, evidence accumulated that Mr. Akers' finger-pointing at the continuing lag in U.S. capital spending is justified, particularly in the soft industrial underbelly. While GM announced that it was sharply cutting back on new project spending and LTV filed for bankruptcy, government statisticians projected that industrial output slipped another .5% in June, for the fourth decline over the first five months of 1986, and estimated that the industrial operating rate fell to a little over 78% of capacity. In that climate, multimillion dollar mainframe investments will inevitably generate second and third looks before a company decides it needs the additional punch.

Nevertheless, the ullage issue is not just an optical illusion created by downsizing and/or budgetary constraints, since the overall rate of growth in the demand for additional performance has been tapering off. IBM has been trotting out statistics claiming that in one month, 3090 MIPS shipments exceeded those of the entire 370 family -- that in its first quarter, 3090 MIPS surpassed the entire 303X family -- and that over its lifetime, the 3090 will top the total performance level of all shipments of earlier IBM mainframe families. There is no reason to doubt those numbers, but another statistic is more relevant: from an annual growth circa 50% in the early 1980s, IDC estimates that installed MIPS will climb only around 30-35% in 1986. With lower percentages of computers going into virgin territory, the MIPS ceiling in the installed base becomes a major problem for mainframe vendors.

IBM's short-term options are fairly limited. It has already initiated the classical responses to faltering mainframe demand, price cuts and accelerated delivery of additional models. Eventually the first will cancel out the advantages of the second; 1987 should be a better year for IBM in unit shipments as the 3090 family fills out to its full complement, but price cuts, accelerating as Sierra nears the end of its life cycle, could undercut revenue growth.

IBM has probably also been working on another short-term option: revving its vaunted marketing machinery into overdrive, as it did in last year's fourth quarter. IDC has cast its 1986 shipment projections within a range in order to accommodate both those respondents who said they would acquire a new mainframe, and those who said they might. All that IBM can be fairly confident of is the lowest figure (5% growth), which roughly corresponds to users who say that they will definitely (and maybe actually) buy this year.

Everything else IBM will have to fight for. Its marketing prowess can never be overestimated; however, 4Q1985 results should also serve as a reminder that it can't work miracles. The Gray Sheet expects that the realistic upper limit on IBM mainframe unit shipment growth in the U.S. this year is around 10%, far short of the 17% growth that is theoretically conceivable if every possible buyer signed a contract.

IBM's best hope for mainframe growth through the rest of the 80's would be to ship higher percentages of large-scale systems outside its installed base. IBM is obviously aware of its opportunities beyond the U.S., since most of its growth for the past year and a half has been international, while the 3090's streamlined number-crunching, particularly in conjunction with its VF option, demonstrates IBM's desire to go after segments of the scientific/engineering community that it had been ignoring. However, computer market maturation, and possible MIPS saturation, loom internationally within a couple of years, and IBM's skill in marketing technical computing is still largely unproven.

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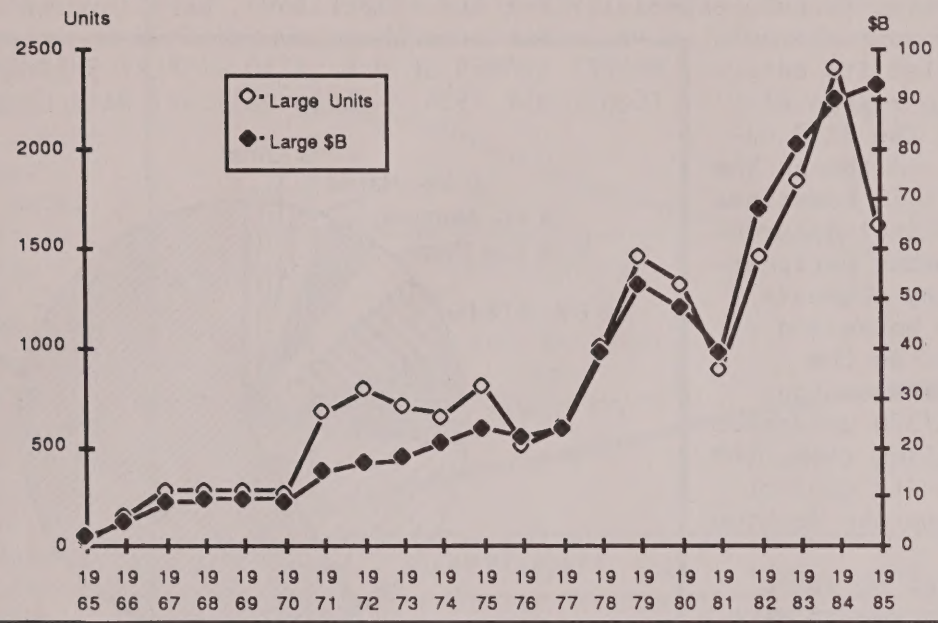
IBM'S ANNUAL U.S. LARGE-SCALE SYSTEM SHIPMENTS, UNITS AND VALUE, 1965-1985
(Copyright 1986 -- International Data Corporation)



The temptation to take a different tack towards recovering mainframe growth rates will likely become very powerful in Armonk: delivering the first model of its "Summit" generation of mainframes in 1988, much earlier than it had planned. There are, however, two potential problems with this approach. First, it is not clear that the technology and production facilities could be fully in place to meet so accelerated a schedule. And second, it probably wouldn't work. It might solve the problem if, as some have argued, the primary reason for lagging 3090 sales were fuzzy product differentiation from the 308X line. However, if, as the survey data indicate, the underlying issue is a surfeit of MIPS, how could even more MIPS on more expensive systems help?

What, then, of the early 1990's, as multiprocessor Summit mainframes potentially treble and quadruple the commercial performance of a 3090-400? Some users certainly will be able to use the MIPS by then; the question is, how many? The answer is, not enough without broadly useful new applications and functions for mainframe computing. History seems to suggest that they can be found, and that MIPS growth could accelerate again, but to initiate the process IBM's crucial mainframe challenge may now be software development.

PUTTING IBM IN CONTEXT

The annual industry overview special report from the editors of the Gray Sheet (in the current incarnation, Computer Industry Review and Forecast, 1981-1990) should be available by early September. The report will include large-scale systems forecasts through 1990 revised since the March 28, 1986 Review and Forecast Issue of the Gray Sheet to incorporate the latest survey results.

IBM at Halftime: Strategies and Prospects Through 1990 is a currently shipping special report that looks over the range of IBM's product line and possible future directions. It explains why the editors believed, even before the Sierra survey results were in, that "IBM as we now know it in all likelihood cannot meet its stated goal" of becoming a $100 billion company by 1990.

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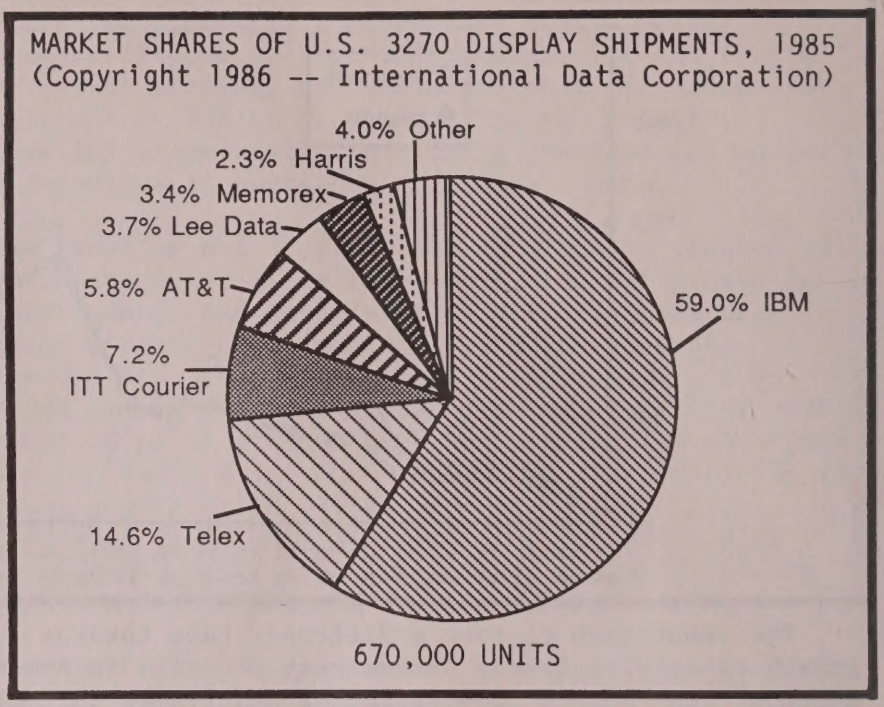
3270 TERMINAL VENDORS BEGIN TO DISPLAY ANXIETY

Among the legion of press releases unleashed by IBM at last month's NCC, not the least significant, especially for its competitors, were terminal and controller announcements that signaled its determination to regain direction of the 3270 environment. Although the 3270 market is sometimes defined to include printers and other peripherals, the key elements remain the boxes and boards that do the actual communications with the S/370 universe. By controlling them, IBM can retain its control of the corporate desktop.



The meat of IBM's 3270 announcements were the 3174 cluster controller in one local and six remote models, the 3191 monochrome display replacing the 3178 with sharply improved resolution, the 3194 windowing color display, and the high-resolution 3193 monochrome display station for alphanumeric and image information. But the dessert for users is what is causing the competition to choke: price/performance levels on the new products, and price cuts on older models, that will be very difficult to match.

Some are going to try. On July 16 Memorex slashed prices on its 3270 line 15-50%, with its 2178 substitute for IBM's 3178 being cut 27% to $958. But what worries participants is the prospect that 3270 displays are about to suffer the same price/profits erosion that has so destabilized the ASCII market.

3270 displays, after all, are only one segment of the churning 3270 environment, which also includes ASCII terminals, emulation boards, and PCs.

- While the 1985-1990 compound annual growth rate for U.S. unit shipments in the 3270 environment will be a damp 10%, from 904,000 to 1,460,000, the revenue growth rate will be only half that, at around 5% as shipment value grows from $1.6 billion to $2.0 billion.

- The 3270 display sector of that environment will grow only around 4% annually, from 670,000 to 810,000 units, while the value of shipments will fall at the same rate, from $1.1 billion to $940 million.

- ASCII displays with protocol converters, a small segment of today's market, will also slip in value, while IBM's 3270 PC will be flat.

- The growth area will be emulation boards, including gateways; unit shipments should climb from 187,000 in 1985 to over 580,000 in 1990, and in value from $194 million to $848 million, a 34% annual jump.

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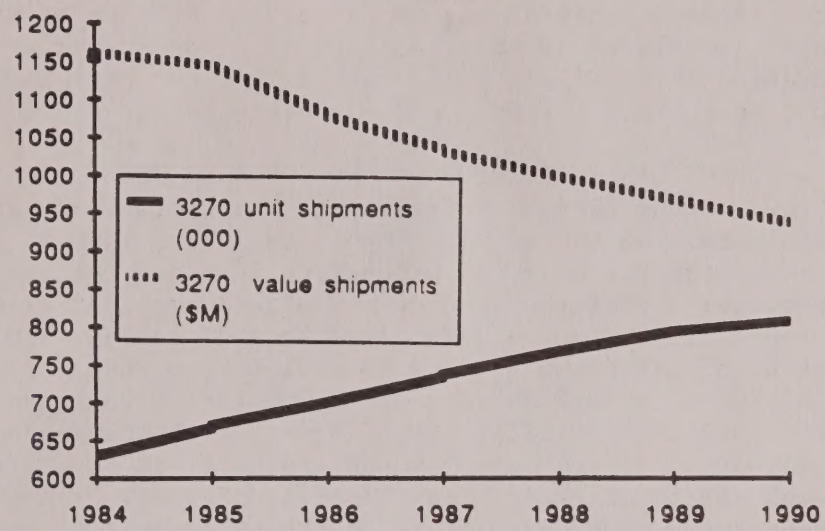
The new announcements indicate that IBM has no intention of relinquishing the 3270 display market. In the U.S., it will muscle for more market share with price/performance. Where the market still has growth potential, as in Europe, it will try to boost its presence. Support of protocols popular in Europe (V.21, V.24, V.35, and X.25 as access to OSI) on the 3174, and the emphasis on color, more in vogue in Europe than in the U.S., underscore IBM's desire to garner a higher 3270 share there.

U.S. 3270 DISPLAY SHIPMENTS, UNITS AND VALUE, 1984-90
(Copyright 1986 -- International Data Corporation)

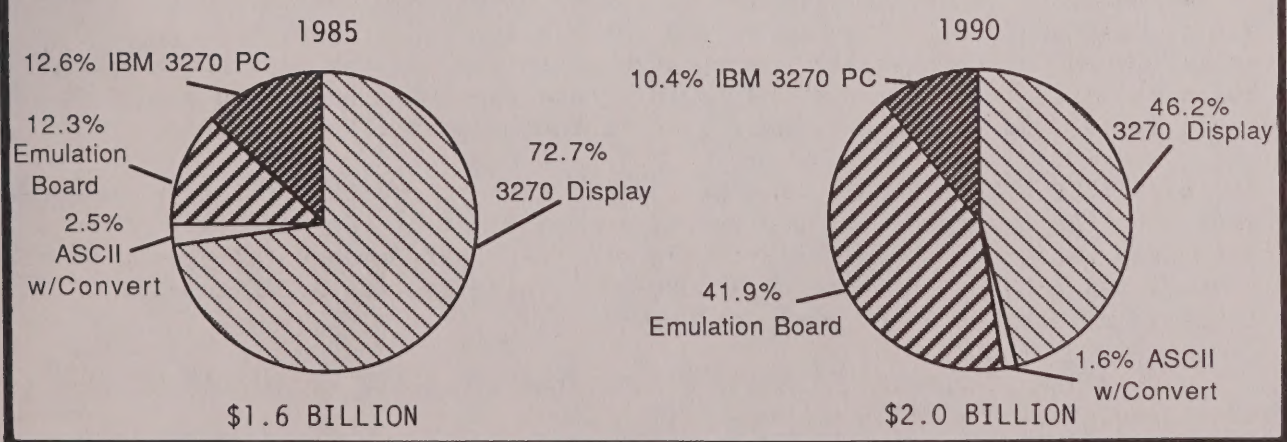


But IBM doesn't care how it controls the desktop and communications to its mainframes, as long as it does. In conjunction with its new SRPI as a standard format for micro-to-mainframe applications, IBM could choose to expand its 3270 emulation board business. Without half trying it already controlled 11.5% of the U.S. market in 1985, second only to DCA's IRMA board, and had made its 3270 API a de facto standard in emulation packages.

Moreover, in price there is now little difference between a low-end 3270 display and an IBM ASCII display with the requisite links to the 3174. Others' ASCII displays with the same connections still cost less as onesies, but half the cost difference disappears with volume discounts. IBM's new aggressiveness thus has implications throughout the volatile terminal market.

(This article is based on research in an IDC report on terminal emulation boards for PCs, and a forthcoming study of the 3270 market.)

VALUE OF 3270 ENVIRONMENT SHIPMENTS BY TECHNOLOGY, 1985 AND 1990
(Copyright 1986 -- International Data Corporation)



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• WHO DO YOU ANTITRUST? One of the most sincere, if hardly most desired, forms of flattery is an antitrust suit. In a backhanded compliment to its recent success, Digital has been slapped with one by System Industries. The specific complaint is that, as Digital "closes" its architecture with innovations like VAXBI, it is pushing its own peripherals line and unfairly competing against the DEC-compatible vendors it previously encouraged.

• ADDING LINKS AT LOTUS -- AND SEVERING THEM. T-A-C (The Application Connection) is the micro-mainframe link that Lotus has extracted from its I-Link acquisition. In tandem with the 14 I-Linkers whom it kept on, Lotus generated new code atop the original product to increase the number and smoothness of connections. What the product now offers are central connections capable of transferring data and dictionaries to and from VM ($10,000) or MVS ($13,000); a series of mainframe options (Ramis, Focus, SAS, IC/I, SQL/DS, Nomad, ADR S2, and APL/D1 -- no DB2 as yet) at $8,000 for VM versions and $10,000 for MVS; and PC options, including dBase as well as Lotus products. It represents a new direction for Lotus in another respect, in that marketing must be handled through direct sales from the 17 field offices. T-A-C is a symbol of the changes Lotus is undergoing as it struggles to find ways to regain some of its earlier momentum when 1-2-3 was in high demand. It was appropriate, then, that Mitch Kapor, the man most responsible for the original success and direction of Lotus, stepped down as chairman of the company a couple of days after the product announcement. Jim Manzi is now Mr. Everything at Lotus.

• HONEYNEC NUMBERCRUNCHING. Honeywell and NEC have agreed to set up an equal equity joint venture to market NEC's supercomputers in the U.S.

• CDC FUTURES. Control Data is now offering $350 million in notes and convertible debentures, in its first financial move since the deteriorating financial situation last autumn forced it to cancel a $300 million offering. Timing seemed to be coordinated with the announcement of mild midlife kickers for the CYBER 180 line: a doubling of maximum memory for entry-level systems to 64MB; a higher-capacity, more compact I/O subsystem for midrange systems; and a quadrupling of maximum memory for the top of the 180 line. Also, the dual processor version of the 990 is now called the 995E. More significant than the additions, though, is the subtraction: to bring its systems more in line with the competition, CDC has cut prices throughout the CYBER 180 group.

• IBM JUMPS ON DESKTOP PUBLISHING. With electronic (a.k.a. computer-aided, a.k.a. desktop) publishing one of the few really high-growth, high-publicity areas around these days, IBM has created a new I.B.U., the Publishing Systems Business Unit, to figure out how to integrate standard IBM products with the new printing and software technologies in the most profitable manner.

• TRILOGY-FUELED ELXSI. The president of Elxsi credits Trilogy's investment over the past year for its recent announcement of the new System 6400 processor that can double fully configured Elxsi performance (allegedly to six times a VAX 8800 or the same as a 3090-200, which implies a Digital/IBM comparison that Ken Olsen will not appreciate).

• CHIP WAR STALEMATE. The big news is that, despite repeatedly missed deadlines, there is still no news.

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THE GRAY SHEET
Computer Industry REPORT

D.C.BELLOMY, EDITOR MAY 30, 1986 • VOL.22, NO.3 P.J.MCGOVERN, PUBLISHER

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• A major merger will occur in the Bunch. -- "From the Crystal Ball: The Top Stories of 1986," Gray Sheet, Vol. 21, No. 17, December 20, 1985

THERE THEY GO AGAIN: BURROUGHS FINALLY ACQUIRES SPERRY IN ITS BID TO UNBUNCH AND BECOME THE NEW NUMBER TWO

If you merged Burroughs and Sperry, would you be creating a seven-foot center with the height and strength to toss skyhooks above the rest of the Bunch and rebound Digital and IBM misses? Or would you just be getting the seven feet by putting Willy Shoemaker on top of Dwight Gooden's shoulders and asking them to guard Akeem Olajuwon?

Burroughs' Mike Blumenthal was bound and determined to find out. Less than a year after the "Spurious Spurroughs" debacle, Blumenthal launched a new effort that deserves a niche in West Point military history courses as much as in the Harvard Business School's case studies file.

Burroughs obviously studied last year's mistakes before making its move. After the abortive Sperry-ITT talks in March 1985 indicated that Sperry was looking for a partner, Blumenthal initiated secret negotiations that inevitably leaked and raised Sperry's stock. By the time Burroughs and Sperry officially announced the discussions on June 13, investors and the trade press had already made up their minds, and the stock of both companies fell. The final offer from Burroughs on June 16 was reportedly for $65 dollars a share, or about $3.7 billion -- $5 a share more than Sperry had been asking from ITT.

The catch was that Sperry wanted to link up with an expert in an area of weakness, preferably in telecommunications, and maintain its identity as a major force in computers and defense. If they could have their druthers, Sperry execs did not want to be another computer vendor's (or, on a more personal level, Mike Blumenthal's) junior partners. The market's reaction allowed them their druthers, as did a safety net whereby the deal would be for less if Burroughs stock fell too far. On June 17, Burroughs withdrew its offer.

On May 5, 1986, Burroughs struck again. This time there were no advance negotiations, simply a public announcement of a $70/share offer worth $4.1 billion. What negotiations there were at this early stage were with the press and investment community. Many were unconvinced that the combined company would be able to achieve the return on investment that Blumenthal was touting, particularly with the debt that the deal would incur, but Burroughs' blandishments effectively muted the opposition on which Sperry depended last year. Then Burroughs promptly converted the offer into a hostile bid. Sperry frantically looked for a "white knight," reputedly even other Bunch companies, before realizing all it could do was raise the ante. On May 27, for $76.50 a share, or $4.8 billion, the computer industry had a new number two.

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The new entity is as yet unnamed. There are reports that Burroughs internal documents have referred to it as Nova, which is certainly more euphonious than Nuco, which Honeywell was calling the result of the merger of its computer line with GE's in 1970 before settling on Honeywell Information Systems, but sounds too much like another product manufactured in Detroit. But of more moment than what it is called is what the merger means. The Gray Sheet notes:

- IDC data indicate that Burroughs has been correct that, despite inevitable areas of overlap, there is a reasonably good fit between Burroughs and Sperry markets in U.S. industries and internationally.

- History and initial reactions from Sperry users suggest that during the shakeout cruise, the combined company will make less money than the two would have made as independent vendors.

- There are indeed long-term benefits in procurement and marketing for the merged companies, but other advantages must be foregone if Burroughs is serious in its pledge to the Sperry base to maintain both companies' incompatible computer lines indefinitely.

- Although in all likelihood neither IBM nor Digital, Number Two until May 27, will feel the need to do anything differently, the new combo could signal other takeovers, mergers, and/or "relationships" in the troubled computer industry.

Since Blumenthal left the floundering Carter administration for what was then the scarcely more robust Burroughs Corporation, he has revived his charge by pursuing a dual strategy: focusing the core company's hardware, software, and marketing resources on a few strategic markets where it has historically shown strength, and expanding its horizons through new acquisitions.

Prior to the Sperry merger, Blumenthal's most significant harvests have been System Development Corporation, a computer systems house servicing the U.S. government, and Memorex, which supplies storage systems for Burroughs and a range of peripherals for the IBM-compatible market. SDC booked contracts in 1985 that will eventually be worth over $650 million, and accounted for most of the 20.6% of U.S. customer revenue last year deriving from the U.S. government.

Memorex has been a different story of late, due mostly to problems with its 3380-class devices. It is now spreading the word that the glitches have been corrected and Memorex reliability is second to none. Nonetheless, although the Sperry acquisition theoretically increases Memorex's captive base, its future, at least in its present form, is now questionable; with its new debt load, Burroughs can't afford cash drains. It had already sold off its fax and business forms segments to improve cash reserves before initiating the play for Sperry.

Moreover, Memorex has not been the only albatross around Blumenthal's neck. If Burroughs' fiscal year ended in March like Sperry's, its revenue of $5 billion would have represented a gain of only 2.3% over the previous year, compared to Sperry's jump of 15.5% to $5.74 billion. Burroughs is shipping new large-scale and medium-scale systems, but demand has not been overwhelming.

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So why was Burroughs buying Sperry, rather than the other way around? For two reasons: Blumenthal's Burroughs thinks that way, and Sperry didn't. It also probably didn't hurt that Burroughs maintains a firm toehold in attractive niches.

Banking is what writes Burroughs' checks. It has nearly 30% of the U.S. medium-scale banking business, and as much of the large-scale as a nonblue vendor could expect (IBM and PCMs have over 90% of the installed base in U.S. banks, Burroughs has 8%, and everyone else has under 2%). It is also strong in the health industry, splitting the non-IBM base with Honeywell. Federal, state, and local governments represent the only major niche shared with Sperry.

BURROUGHS YEAREND 1985 INSTALLED BASE OF LARGE- AND MEDIUM-SCALE SYSTEMS BY INDUSTRY
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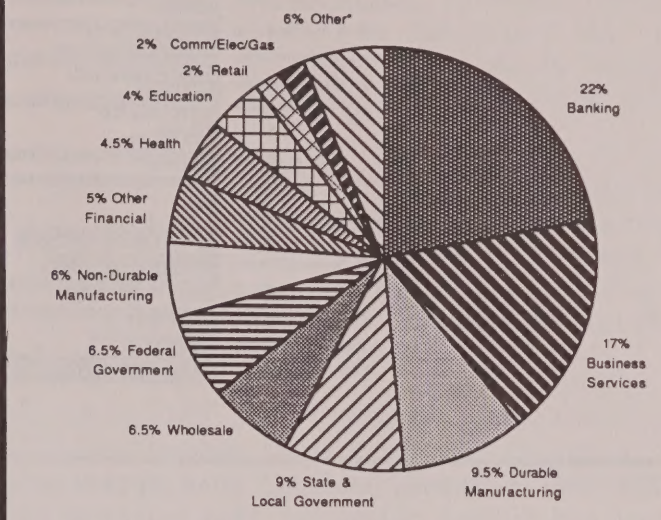

*Agr/Min/Const, Insurance, Other Services, and Transportation

3,870 Systems

The strong performance by Sperry over the past year cost Burroughs a lot of money. If Sperry was worth $65 a share a year ago, there is a strong case that it should be worth over $75 now. The question is whether the long-term prospects of Sperry were worth what Burroughs was willing to pay then or now.

And there is no simple answer to that $4.8 billion question. Sperry has had a seesaw career during three decades in the computer field. Univac's first ten years in Sperry Rand were so dismal that as recently as 1965 a number of stockholders wanted to sell off the division; then it took off as the non-IBM vendor of choice. Since then there have been ups and downs, with more of the latter than the former for most of the 1980s.

Last year's results were partly the effect of favorable product cycles, but also indicate that it is marketing more effectively than in the recent past, especially overseas. Sperry may also be closing its technology gap, which has been forcing it to rely on startups. Hitachi will probably be supplying what Encore and Trilogy couldn't deliver.

SPERRY YEAREND 1985 INSTALLED BASE OF LARGE- AND MEDIUM-SCALE SYSTEMS BY INDUSTRY
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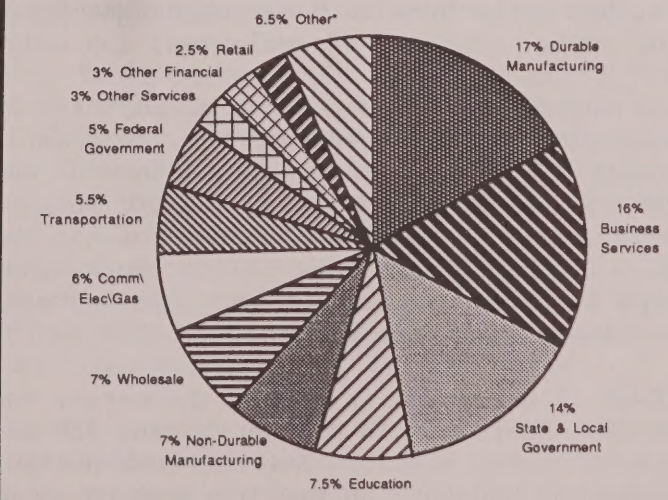

*Agr/Min/Const, Banking, Insurance, and Health

1,970 Systems

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BURROUGHS/SPERRY SHARES OF LARGE-SCALE SYSTEMS IN U.S. INDUSTRIES
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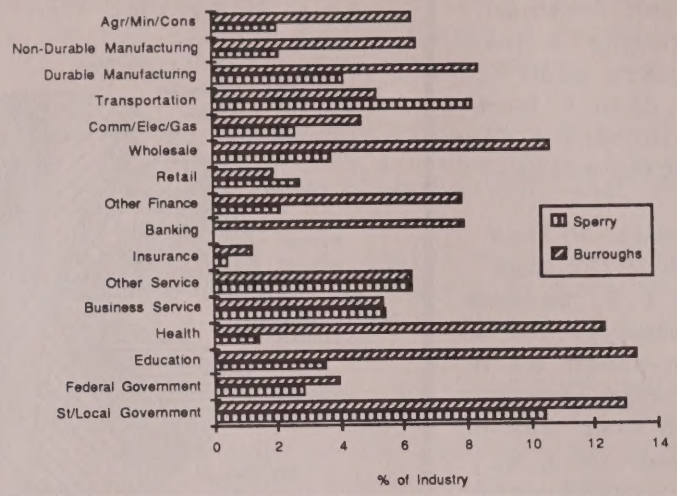

The fact remains, though, that Sperry's computer segment is still more past history and future potential than current success. Its Unix strategy for the midmarkets is not meeting expectations, while its heavy investment in AI technology is still probably half a decade from payday. It doesn't compete in Burroughs' niches, but neither does it dominate in comparable ones. Sperry's undisputed strength has been its defense segment; in computers, it turned a corner in 1985, but no one could say for sure what awaited on the other side.

The uncertainty is now magnified. Sperry users are chary about the future, and are reportedly reacting much as GE users did in 1970 after the Honeywell deal -- canceling deliveries and looking to IBM for stability. The combined Honeywell Information Systems made 6% less in computer shipments in 1980 than the two companies together totaled in 1979. Over time, Honeywell was able to profit handsomely from the deal, but users accepted the inevitability of incompatible architectures in 1970 much more readily than they do now. Moreover, the debt burden on Burroughs increases the pressure on it to sell off more assets (Blumenthal has promised to raise $1.5 billion that way) and make cuts wherever possible. Much can be gained through plant closings and real estate sales, but units from both Burroughs and Sperry will undoubtedly feel the paring knife. Users (and employees) can only guess who and what gets cut.

So why did Burroughs chance so much for so uncertain an advantage? The scenarios offered by observers have been as incompatible as the Sperry and Burroughs operating systems. It's for the defense business, some say, and Burroughs will sell the computer line (to whom, one wonders). No, it will have to sell some of the defense to pay for the computers it really wants. And so forth. The best guess here is that Burroughs is convinced that, marginal savings in parts procurement and combined marketing aside, it will now win sales simply by virtue of size. If IBM can do it, why can't they?

Even if Burroughs is right, the merger won't undercut IBM's mastery of the industry. Certainly in the short run, IBM gains from increased uncertainty elsewhere in the market. But the combination, if reasonably successful, could increase the pressure on smaller vendors to make their own alliances or mergers. Honeywell, for example, might feel compelled to deepen its ties to NEC. That would be the final irony of a merger portrayed by Burroughs as necessary to protect the industry from control by IBM and the Japanese.

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THE SLIPPERY SLOPES OF SECOND-BEST

The headline in the Gray Sheet almost sixteen years ago to the day (Vol. 5, No. 15, May 29, 1970) read: HONEYWELL AND GENERAL ELECTRIC TO MERGE COMPUTER CAPABILITIES; NO QUESTION NOW ABOUT WHO'S NUMBER TWO. No question, that is, until 1974, when Honeywell Information Systems, as the combo came to be named, was overtaken by two other Bunch companies that finished the year in a virtual tie: Sperry-Univac and Burroughs.

Univac, moreover, achieved its sales position in 1974 in part due to its acquisition of the RCA base in 1972 . . . but only in part, despite initial assumptions from adding the value of the two manufacturers' 1971 shipments (Univac's were worth about twice RCA's) that the merger would allow Univac to reclaim second place immediately. In fact, the value of combined Univac/RCA shipments in 1972 was only 2% more than just Univac's in 1971.

For all the momentary excitement of seeing only IBM ahead, the identity of Number Two changes as often as it did on the old "Prisoner" series, as a list of yearend also rans, culled from two decades of the Gray Sheet, indicates:

1986	Burroughs/Sperry combo (presumably)		
1985	Digital	1975	Burroughs
1984	Digital	1974	Univac
1983	Burroughs	1973	Honeywell
1982	Burroughs	1972	Honeywell
1981	Digital	1971	Honeywell
1980	NCR	1970	Honeywell
1979	NCR	1969	Univac
1978	NCR	1968	Univac
1977	NCR	1967	Univac
1976	NCR	1966	Honeywell

The number of names is small -- just four -- but no company in that twenty-year period made the list more than five times, with NCR's 1976-1980 string the longest of the era. Runner-up status has been achieved in different ways: by merger; by a mix of products in high-volume cycles; even by a single product redefining the market. But no one approach guarantees long-term success.

The elusive formula will continue to be sought, since manufacturers believe that a critical mass is necessary before users automatically view a particular vendor as the alternative to IBM. Although Digital achieved runner-up status in 1984 and has been describing itself as the chief competitor to IBM ever since, it probably only reached that critical mass in early 1986. A major consideration in the decisions by GE and RCA to merge with larger manufacturers, at least as former execs reconstructed events during the IBM antitrust trial, was a felt necessity to control 10% of the general purpose market in order to compete with Big Blue. And Blumenthal has repeatedly noted that Burroughs needed to get bigger to be viewed as a permanent factor in the market.

While there's no reason to doubt Burroughs' permanence, there is historical justification for questioning its longevity in the number two slot. The industry changes too fast, and the advantages of size or technology are too unstable. Ironically, the would-be number twos' failed attempts to achieve an IBM-like inevitability probably only strengthen the long-term prospects for IBM to remain on top by underscoring the allure of security.

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THE NUMBERS GAME: THE INTEL 386 AND PC-COMPATIBILITY

As Intel puts the finishing touches on its 80386 32-bit microprocessor, it is trying to line up business before starting volume production. In its matchup with National Semi's 32032 and Motorola's 68020, introduced in 1983 and 1984 respectively, the Intel 386 will lean heavily on its access to the myriad of applications written for IBM-compatible PCs with earlier Intel chips.

A breakfast with the 386 marketing manager attended by several IDC analysts and a consultant briefing held by Phoenix Technologies (ne Phoenix Software Associates) established some of the salient issues for the 386:

- Early runs have turned up only a few fixes that are still necessary. With limited initial production looming, Intel plans to produce 100,000 386 chips in 1986, and 500,000-1,000,000 next year.

- The initial implementations in 1986 will be turbo ATs with add-in 386 boards and 70/80MB disks for graphics applications and the like. Before IBM gets on board, some turbo ATs will probably be tailored by OA vendors for multiuser clustering.

- The 386's key component is its ability to support a virtual monitor or "hypervisor" for multitasking among different operating systems (e.g., Unix and PC-DOS) in a virtual rather than emulation mode.

- Intel believes that, unlike the situation with the 286, software developers will make use of the performance capabilities of the 386. Phoenix execs, though, emphasize that the installed base of 8088 machines and software (including windowing products) will sharply limit the market for application software running only on the 386.

Anxious to avoid the near-fiasco of the 286's early days, Intel has apparently learned its lessons and kept production more or less on schedule. It has shipped around 2,000 sample chips to date, and in return has chalked up over 100 design wins. The lion's share (around 40%) have gone for PCs, OA, and departmental computing. Another 25-30% of the wins are from workstation vendors, with Daisy the only publicly acknowledged contract. The remaining 386 wins are divided between embedded controllers and communications uses.

Success in the workstation arena, which has traditionally been terra incognita for Intel, may be partially attributable to its decision to give customers a choice between its 387 coprocessor, samples of which are on tap for fourth quarter, and the high-performance Weitek 1167 floating point processor now shipping in sample quantities and scheduled for full production in August.

Meanwhile other preliminaries are falling into place. Three unnamed software companies are working on a Unix-DOS virtual monitor, which is supposed to be ready for general release in the second half of the year. A C-compiler for the 386 is already on board, while beta availability of 386 Unix, developed with Interactive and AT&T based on the imminent Unix release supporting virtual memory and enhanced networking, can be expected by August. AT&T certification should come in the fourth quarter, with general release to follow. And even Microsoft is getting into the act before intermission this time: DOS 5.0 supporting the 286 won't pop up until the first half of 1987, but 6.0 supporting the 386 could be announced virtually simultaneously.

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More, though, is necessary before the 386 chip can sell in volume, most importantly the standardization that IBM has supplied in the past. Without IBM, the compatibles would all have to pull their oars in unison and in the same direction. The would-be coxswain in this effort is Phoenix Technologies.

According to one company exec, "Over 80 percent of the computer manufacturers, world-wide, now buy advanced technology, compatibility chips, boards, system software, and networking products from Phoenix." Its first major success was its IBM-like ROM BIOS, while of late it has developed coprocessors in "hybrid" environments for customers like HP and Apollo. A new Integration Services Division is handling a recent contract with Lotus, in which Phoenix is writing, licensing, and helping distribute drivers for peripheral vendors who want to insure that their products interface properly with Lotus software.

The 386 represents both challenge and opportunity for Phoenix. To the extent that the 386, with its ability to support virtual rather than guest coexistence of distinct operating systems, supplants the 286 as the high-performance PC processor of choice, Phoenix's coprocessor business will be affected. It has to ensure that its other routes to IBM-compatibility are not blocked.

The rush to develop DOS-compatible 386 add-ons plays to Phoenix's hand, but the joker in the deck has been that, without an IBM-standard BIOS for Phoenix or someone else to replicate, vendors were being forced to create their own 32-bit bus architectures for the 386. This chaos of interfaces, Phoenix execs have argued with as much plausibility as self-interest, would only hurt manufacturers' efforts to woo customers before IBM gets into the act.

At Spring Comdex last month, Phoenix CEO Neil Colvin convened a workshop for vendors interested in an early resolution of the bus problem. By Phoenix's count, 66 persons showed up representing 44 companies. A working subcommittee of eight companies (AT&T, Bull-Micral, Chips & Technologies, Inc., Emulex, Olivetti, Phoenix, Quadram, and Tandy) met in Los Gatos on May 22 to iron out preliminary questions (e.g., whether it would be a superset of the AT bus). A final report, which may simply limn the baseline for an evolving standard, is supposed to be ready by late July, three months after the Comdex workshop. To the eyebrows raised at such an ambitious schedule, Colvin has replied, "We don't have a deadline, but the manufacturers do." That is, before IBM acts.

Although IBM was invited to the workshop, Phoenix claims not to know if Bluesmen attended. Is IBM's participation crucial to the endeavor's success? "No," Colvin avers, "it would be nice," but he thinks that compatible vendors have enough market weight to support a separate bus architecture. Compaq, the most potent of the compatibles, was also invited, but is keeping its own counsel. Since so much rides on users viewing Compaq computers as exact replicas, only classier, of IBM PCs, Canion's crew may be waiting to see where IBM jumps.

So are lots of other people. Many expect IBM to ship a 386 product in the first half of 1987, but how IBM uses it to respond to clones and compatibles is still an open question. The best guess here is that IBM will announce its own hypervisor, similar in some respects to the RT's Virtual Resource Manager, that will offer hooks not only into Unix, but into IBM's midscale operating systems. This route would end IBM dependence on replicable elements like ROM BIOS for product identity, and would assuage users anxious for easier communications. It could even allow IBM to accept the Phoenix committee's bus, but don't bet on it: Armonk will not make anything easy for the compatibles if it can help it.

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• NAS STARS. Slightly antedating the first AS/XL shipments, NAS announced schedules for the next three models of its Hitachi-based Sierra-class series. The AS/XL 50, available 1Q1987, will be an entry-level, detuned version of the 60, which competes with the 3090-200. Its internal throughput, estimated at .6-.8 of an AS/XL 60, will be higher than a 3090-180's, since the 60 has been a uniprocessor all along. Around half a year after the 50 is available, NAS is promising a triadic 90 and a quadratic 100, which are projected to offer throughput respectively 2.4-2.7 and 2.9-3.4 times a 60. NAS warns that there are so many potential trade-offs between architectures that no single number (e.g., MIPS) can predict performance differentials for individual users between generations of a single vendor's systems, let alone between NAS and IBM offerings. Test-driving applications is held to be the only alternative.

• ANOTHER AT&T REORGANIZATION. In tandem with a changing of the guard (James E. Olson officially succeeds Charles L. Brown as CEO on September 1, while Robert E. Allen moves from Information Systems to Brown's former position as president and COO), and in the wake of the U.S. government's decision to drop the bars separating computer and communications marketers, AT&T is merging both Information Systems and Communications under Randall L. Tobias, formerly Communications head and now AT&T vice-chairman. Three group presidents under Tobias will integrate sales and marketing for business, general, and special (e.g., OEMs and VARs) markets, while a fourth designs and manages the AT&T network in support of the other three. James D. Edwards' computer systems branch, formerly in Information Systems, moves under the business markets group.

• TECHNICAL SPECTRUM. HP has unveiled the 840, the first product in its 9000 family of Unix-based Precision Architecture technical products, rated at better than twice the performance of the 9000 Model 550 or 1000 A900. There are also some upgrades to existing offerings, including an AT coprocessor.

• WANG IMPROVES OA LINKS TO IBM. Upgrades to the Wang Office/DISOSS gateway open it to better intervendor communications. An LU 6.2 transport option has been added, while end users can now exchange documents between Wang Office and DISOSS without filing them first in the DISOSS library. A later addition will allow final-form document exchange to prevent unwanted revisions. Also, the Wang/PROFS gateway will now allow the exchange of messages between Wang Office and PROFS and, by dedicating a single Wang VS to PROFS communications, eliminate the need for separate communications lines between each VS and the IBM mainframe. IBM Token Ring and SNADS links are promised for the future.

• LOTUS BUYS PICTURES. Presumably in response to gripes about its IBM-compatible graphics capabilities, Lotus has signed to buy Graphics Communications Inc., and with it the rights to GSI's Graphwriter and Freelance products.

• S/36 COMPATIBLE. As IBM was announcing the shipment of its 100,000th S/36, Decision Data introduced a S/36 compatible with access to PC software.

• BLUE FINANCES. On the plus side, IBM's May 27 announcement that it would put its money where its mouth was and purchase up to 10 million shares of its capital stock is having the desired effect of raising expectations and the stock price. On the minus side, its first quarter 10-Q reveals that IBM inventories grew 7.4% over 1Q1985, mostly due to a bulge in work in process.

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REVIEW & FORECAST PART II

THE GRAY SHEET

Computer Industry REPORT

D.C.BELLOMY, EDITOR MAY 16, 1986 • VOL.22, NO.2 P.J.MCGOVERN, PUBLISHER

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THE MERCURIAL MIDMARKETS: DESPITE SHIPMENT STASIS, REVENUE STILL GROWS

There is a tide in the affairs of men, Shakespeare has taught us, which taken at the flood, leads on to fortune. We must take the current when it serves, or lose our ventures. What Shakespeare didn't tell us was how to judge where the tide is going amid the crosscurrents. That has been the problem recently for vendors in the medium-scale and small-scale computer markets.

The effect of the Great Softness in medium-scale sales was particularly traumatic because of the expectations raised by the great leap forward in 1984, when worldwide shipments and shipment value both escalated 38%. However, revenue in this sector has traditionally ridden a roller coaster. Compared to the two relatively flat years following 1981's 25.5% growth, the wonder may be that so much money was earned during last year's recession.

- Worldwide medium-scale shipments in 1985 were a little under 40,000 systems, representing 3% growth.
- Still, the value of those 1985 shipments grew 9% to $14.6 billion.
- IDC projects that shipments in 1986 will rebound at a 14% clip, to 45,600 systems, but revenue will grow only 8% to $15.8 billion.
- After growing nearly 15% annually from 1980 to 1985, the value of maturing medium-scale shipments should climb a little over 9% p.a. 1986-1990. The annual growth rate for unit shipments was just under 20% 1980-1985, but will dip to about 11% for the rest of the decade.

Especially in the U.S., small-scale shipments took a beating last year. Ironically, though, revenue growth has been and should continue to be fairly steady in traditionally the most volatile, wide-open sector in the industry.

- A shipment decline of nearly 10% in the U.S. balanced out with 10% growth internationally to a worldwide drop of 4%, to 325,400 units.
- Small-scale revenue grew 11% in 1985, more than the 10% annual average from 1980-85 and not much less than the 13% achieved in 1984.
- IDC estimates that shipments should grow 9% in 1986, with shipment value augmenting at a 12.5% rate, from $12.3 to $13.9 billion.
- The less mature small-scale market should grow nearly 14% in units 1986-90 and 12% in value, compared to 10.5% and 10% 1980 to 1985.

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Superminis Mostly More Mini Than Super

In mid-1985, there was much talk of weakness in the traditional supermini market. In retrospect, while few vendors did as well as they would have preferred, relative failure was often balanced by comparative success. Moreover, with growth rates starting to slacken, the dividing line between the two takes on increasing importance as an index of future haves and have-nots.

IBM. Big Blue's effort to establish itself more forcefully in the supermini market saw few dramatic moves in 1985, but it certainly held its own. It almost tied Digital in unit shipments with 26% of the market, and at 22% of the installed base is rapidly approaching DEC's leadership position. With almost 31% of the worldwide value of medium-scale shipments in its ledger, IBM ever-so-slightly increased its domination of medium-scale revenue.

IBM outperformed the sector last year, with shipments growing at a rate almost double the slack overall industry percentage. Nevertheless, IBM can't be very happy with its medium-scale sales, which have been fairly flat for a couple of years now. Shipments of 4381s, for example, gained no ground in 1985 over 1984, although the 20% that were Model 3s netted higher revenue. Even so, IBM can thank the migration of 3380 storage to 4381s for a significant proportion of its 11% growth in medium-scale revenue, to $4.5 billion.

With the 4381 replacement series not anticipated to ship until well into 1987, IBM needed to act to shore up this sector for 1986. The mid-life kickers to the 4381 line announced in February probably have the price and performance edges to at least match overall medium-scale growth this year. Moreover, the announcement reinforced a shift in marketing strategy to open new markets for IBM in the sector. The compute-intensive capabilities of the new 4381-11, -12, -13, and -14s are being emphasized, partly to reach scientific/engineering customers, but even more to hit developing commercial applications that crunch numbers the way techies normally do (e.g., financial modeling and forecasting).

Digital. For all the deserved hoopla about Digital's recent performance, it just kept pace with the overall medium-scale market in 1985. Unit shipments were actually down nearly 12% from 1984, to 11,500 systems. However, the fact that over 10% of them were high-end 8600s brought revenue growth in the sector to almost 9%. The net result for the year was a continuing but diminishing lead in unit shipments (29% of the market) and installed base (27%), and a solid second place in shipment revenue (20%, or nearly $2.9 billion).

This year should be even better, since Digital has been assiduously addressing the issues that were keeping unit shipments down. As of the end of 1985, its new strengths at the top of the VAX line (8600s and then 8650s) and the bottom (the bestselling MicroVAX II) only underscored the antiquity of its sagging middle, which was losing sales in both directions. In early 1986, all 7X0s, Digital's standardbearers through the 1980s, were replaced by a new generation of VAX 8X00 systems offering better price/performance and packaging, as well as a new VAXBI bus. Digital has been winning sales by emphasizing its large library of software running up and down the VAX line and its networking capabilities; now it can talk about hardware again, too.

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1985 MARKET SHARES OF WORLDWIDE INSTALLED BASE, MEDIUM-SCALE SYSTEMS
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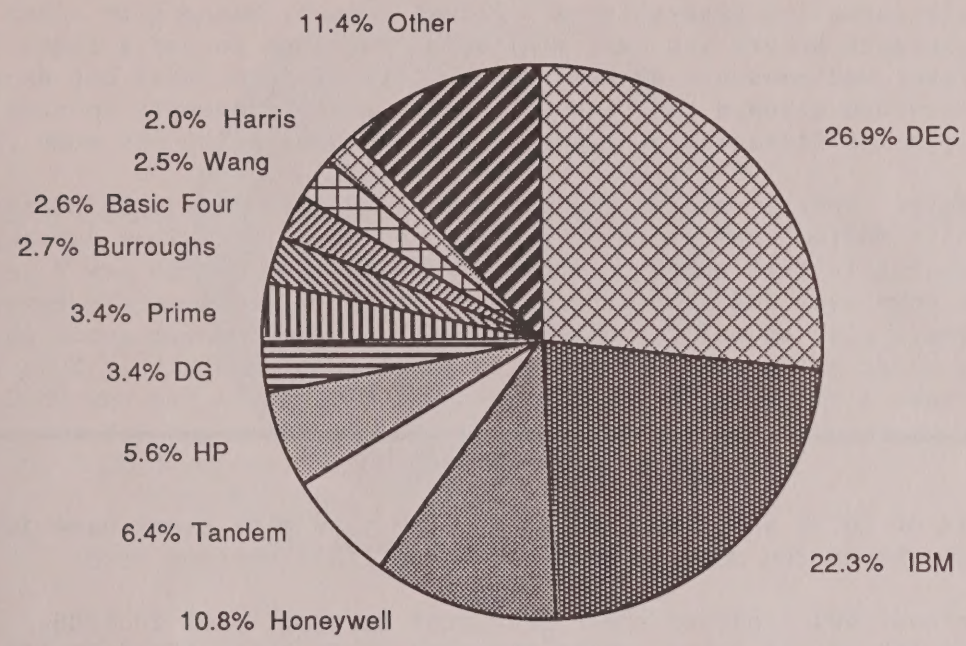

180,430 SYSTEMS

1985 MARKET SHARES OF WORLDWIDE MEDIUM-SCALE SYSTEM SHIPMENTS
UNITS (Left); DOLLARS (Right)
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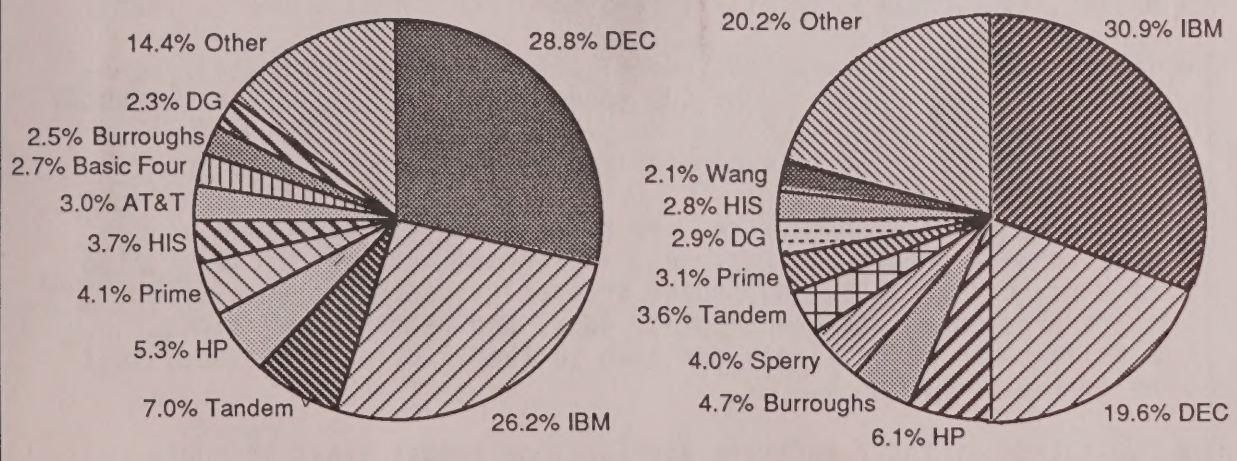

39,970 SYSTEMS

$14.6 BILLION

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Traditional Supermini Forces. It was a mixed year for the vendors usually grouped with Digital. Data General saw its slice of the pie diminish in size, and must hope for a favorable user response to its new MV/20000 recipe. HP's need for its Precision Architecture series was demonstrated as its share of the medium-scale installed base slipped. Prime, though, managed to climb a considerable distance before its supermini sales softened in early 1986. Wang was shipping fewer medium-scale systems (down over 50% from 1984) but enjoying it more as VS revenue allowed the value of medium-scale shipments to rise sharply. For all its financial problems last year, Wang still has some fangs.

BUNCH Vendors. Sperry was the big success story last year. Shipments were up sharply, while medium-scale revenue almost doubled. Its suitor Burroughs was less successful in this sector, with minimal impact from the new V series. Shipments were down over 20%, while Burroughs' share of medium-scale revenue eroded. Honeywell also stumbled, while CDC's doubling of medium-scale shipments fell far short of making it a midscale force to reckon with. NCR, though, could make a bid to join the medium-scale elite with its new 9800.

MIDSCALE MARKET PROFILE

The results of IDC's annual survey of non-IBM supermini users have just been tabulated. Among the more interesting trends that emerged were:

- A little over 40% expected their DP budget to grow 1-10% in 1986. A quarter thought it would remain the same as in 1985, 15% felt it would shrink, while only a fifth anticipated growth over 10%.

- Asked the annual growth rate in installed capacity through 1988, respondents overall were reasonably bullish about demand for CPUs, disk storage, and PCs, less so for terminals, tape, and paper consumption. On the other hand, many seem satisfied with the status quo. The number anticipating zero or negative growth in CPUs was roughly equal to those anticipating 50%+ growth (16 and 17%).

- Supermini users keep their CPUs an average of 5.7 years, and disk drives, tape drives, terminals, and printers a little over 6 years.

- The biggest performance bottleneck, affecting over half the respondents, is disk access -- not CPU speed, which was a problem for 40%.

- Three quarters of their supermini processing is now online.

- Online transaction processing and DBMS are in a virtual tie as the most critical supermini features, edging out multiprocessing. Also of concern, in descending order, are real-time operating systems, batch processing, floating point, 4GLs, and PC/supermini links. LAN links are surprisingly far down in the list in 16th place, just below fault tolerance.

- Two-thirds of their software applications budget stays in-house. For the remainder, the data suggest an accelerating trend this year from purchased packages to third-party custom development.

- Superminis at a quarter of the sites regularly communicate with a larger mainframe. Half use ASCII async protocols; only 10% use SNA.

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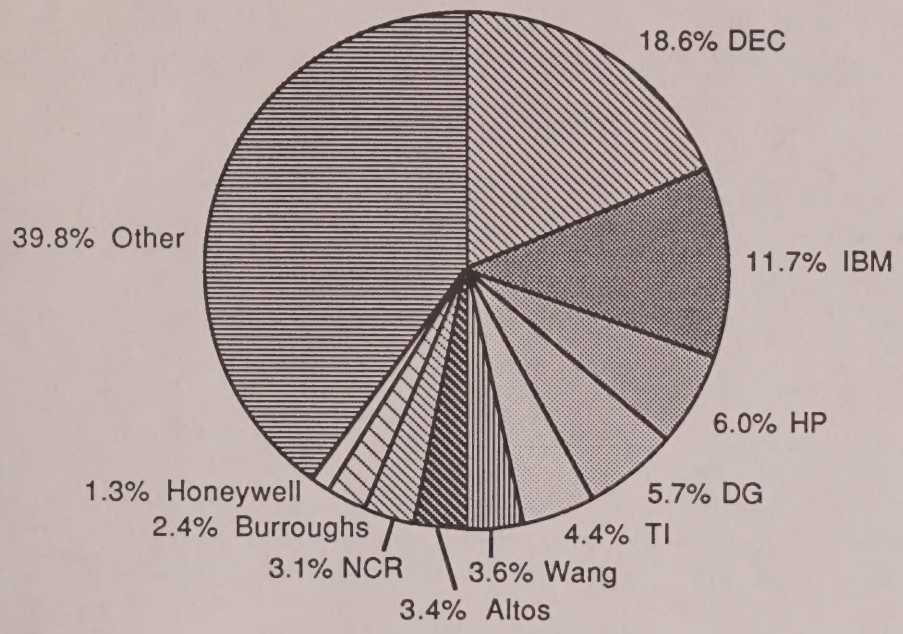

2,170,900 SYSTEMS

1985 MARKET SHARES OF WORLDWIDE SMALL-SCALE SYSTEM SHIPMENTS
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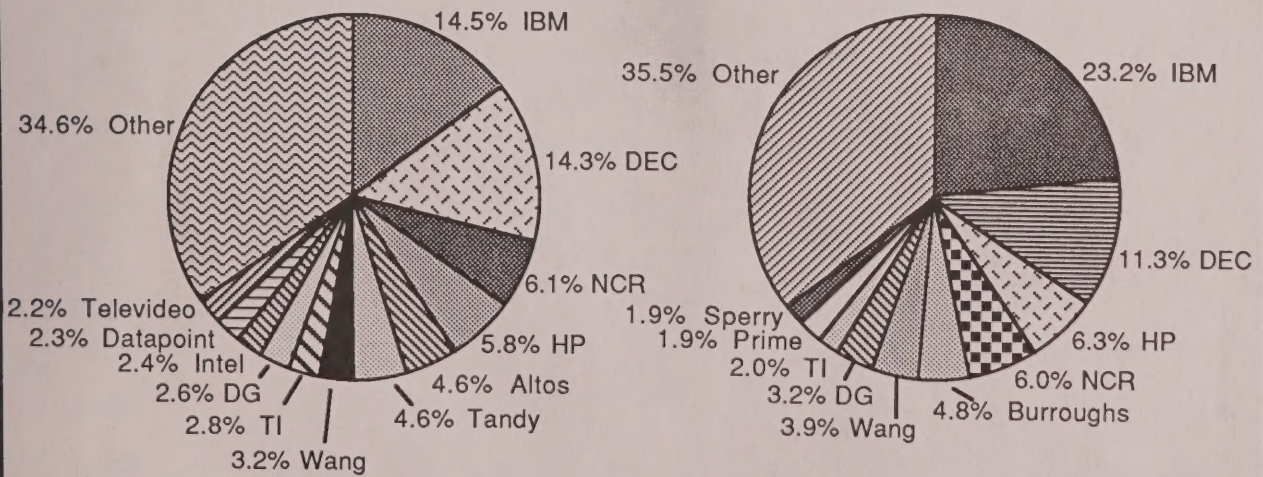

325,400 SYSTEMS

$12.3 BILLION

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MEDIUM-SCALE COMPUTER MARKET -- U.S.-BASED MANUFACTURERS
(Copyright 1986 -- International Data Corporation)

	Number of Systems Shipped	Cumulative Number in Use	$ Million Value Shipped	$ Billion Value in Use
		WORLDWIDE		
1980	16,100	57,600	7,300	34.9
1981	19,200	67,800	9,160	38.9
1982	24,100	87,400	9,100	45.1
1983	28,000	111,600	9,690	49.7
1984	38,650	148,600	13,400	57.9
1985	39,970	180,430	14,610	66.2
1986	45,600	210,105	15,750	76.4
1987	49,900	246,930	17,700	87.2
1988	56,000	288,580	19,900	101.1
1989	63,000	335,205	22,300	115.1
1990	68,900	385,930	24,500	130.7
		UNITED STATES		
1980	9,300	32,100	4,500	17.2
1981	11,100	39,000	5,700	21.1
1982	14,100	50,500	5,600	24.5
1983	16,500	65,700	5,900	28.2
1984	23,950	87,900	8,300	33.3
1985	24,870	108,730	8,760	38.1
1986	26,900	128,905	9,250	43.5
1987	29,100	150,730	10,500	50.7
1988	33,000	175,480	11,800	58.9
1989	37,500	203,605	13,100	67.8
1990	41,500	234,730	14,300	77.1
		INTERNATIONAL		
1980	6,800	25,500	2,800	17.7
1981	8,100	28,800	3,460	17.8
1982	10,000	36,900	3,500	20.6
1983	11,500	45,900	3,790	21.5
1984	14,700	60,700	5,100	24.6
1985	15,100	71,700	5,850	28.1
1986	18,700	81,200	6,500	32.9
1987	20,800	96,200	7,200	36.5
1988	23,000	113,100	8,100	42.2
1989	25,500	131,600	9,200	47.3
1990	27,400	151,200	10,200	53.6

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SMALL-SCALE COMPUTER MARKET -- U.S.-BASED MANUFACTURERS
(Copyright 1986 -- International Data Corporation)

	Number of Systems Shipped	Cumulative Number in Use	$ Million Value Shipped	$ Billion Value in Use
		WORLDWIDE		
1980	197,800	858,800	7,700	34.1
1981	212,500	1,042,780	8,800	40.8
1982	248,300	1,296,160	9,100	49.2
1983	282,390	1,542,970	9,800	56.9
1984	338,800	1,861,720	11,100	65.9
1985	325,400	2,170,900	12,320	74.8
1986	354,700	2,507,870	13,860	85.2
1987	399,640	2,887,530	15,710	97.1
1988	458,210	3,322,830	17,620	110.8
1989	524,530	3,821,140	19,620	125.3
1990	596,350	4,387,680	21,480	140.7
		UNITED STATES		
1980	122,400	566,500	4,600	20.4
1981	127,800	679,130	5,400	23.9
1982	154,300	829,080	5,700	29.4
1983	188,840	991,210	6,100	34.4
1984	240,400	1,216,740	6,900	40.6
1985	216,900	1,422,800	7,590	46.5
1986	232,100	1,643,300	8,500	53.1
1987	261,100	1,891,350	9,620	60.7
1988	300,270	2,176,610	10,770	69.4
1989	342,900	2,502,370	11,930	78.4
1990	387,480	2,870,480	13,070	88.5
		INTERNATIONAL		
1980	75,400	292,300	3,100	13.7
1981	84,700	363,650	3,400	16.9
1982	94,000	467,080	3,400	19.8
1983	93,550	551,760	3,700	22.5
1984	98,400	644,980	4,200	25.3
1985	108,500	748,100	4,730	28.3
1986	122,600	864,570	5,360	32.1
1987	138,540	996,180	6,090	36.4
1988	157,940	1,146,220	6,850	41.4
1989	181,630	1,318,770	7,690	46.9
1990	208,870	1,517,200	8,410	52.2

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The Small-Scale Paradox

The proper use of the term paradox, the manuals explain, is to describe a statement that is only seemingly contradictory or unbelievable. The small-scale market in 1985, when shipments fell 4% but shipment value rose 11%, was a true paradox: it might look odd, but makes sense on a closer inspection. Hardest hit during the Great Softness were cheaper, less powerful minis, which saw their customers dividing between PCs and larger small-scale systems.

Digital. Last year Digital rewrote the prospectus for the small-scale market with the phenomenal success of the MicroVAX II, particularly in the U.S., where 9,000 were shipped (not counting 750 VAXStation IIs). On the strength of its VAX supermicro, Digital's U.S. small-scale shipments rose over a third last year. Overall unit shipment growth was somewhat less impressive, but DEC's worldwide small-scale revenue was up over 25%, to $1.4 billion.

IBM. Except for some penetration of PC technology into the S/36 and S/1 lines, there was virtually no small-scale movement last year on IBM's part. Its departmental flagship, the S/36, is a major disappointment in many eyes (in a recent IDC executive conference survey that paired it with other potentially controversial products, including the Macintosh, PC Convertible, DB2, and the Token Ring LAN, the S/36 was the only product that received a strong negative reaction, with 15% of respondents with an opinion calling it "very bad" -- and more had an opinion about the S/36 than any other topic). So IBM had a perfectly awful year in small-scale systems, right? Not bloody likely.

True, S/36 sales were flat with the same number (33,000) going out the door as in 1984, but with other products taking up some of the slack, 1985 unit shipments were up 3% in a year when the market was going down. Since revenue also slightly outpaced the market average, IBM marginally improved its share of installed base (12%), shipments (14.5%), and shipment value (23%).

Winners and Losers. Still, the small-scale market remains a no-man's-land that no vendor truly controls. IBM and Digital between them account for only a little over a third of the value of shipments and less than 30% of unit ships and installed base. Some vendors gained significant leverage last year, others fell in shipments but gained in revenue, while still others flat out fell.

NCR scored on the strength of its Tower sales, with both unit shipments and value of shipments up over 25%. Altos and Burroughs were examples of vendors whose units were down, but whose small-scale revenue was nevertheless up on the basis of more expensive systems. Losing ground on all fronts in 1985 were Texas Instruments and Data General.

Unix vs. Proprietary Architectures. As noted in the Gray Sheet's yearend wrapup issue (Vol. 21, No. 17, December 20, 1985), the MicroVAX II symbolizes a significant change in the increasingly microprocessor-based small-scale market. Traditional vendors want to restake their claim with supermicros offering compatibility with the software running on their larger systems. DG is trying to emulate DEC's success, while the "Micro-370" chip announced earlier this year probably presages a similar move by IBM. But the alternative of open-architecture supermicros running Unix also gained ground last year (witness NCR, Altos, et al.). Unix is now licensed to 15% of the small-scale installed base; by 1990, IDC estimates, this should rise to about 24%. These figures, moreover, do not take account of Unix domination of the engineering workstation market.

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THE GRAY SHEET
Computer Industry
REPORT

D.C.BELLOMY, EDITOR APRIL 30, 1986 • VOL.22, NO.1 P.J.MCGOVERN, PUBLISHER

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LIFE IN THE SLOW LANE: 1986 STILL NOT ACCELERATING

During the depths of the Great Softness last year, it seemed as if the days were dragon-ridden, and the nightmare rode upon sleep. To be sure, compared to the severe fevers afflicting oil companies, agriculture, and heavy industry, computers just had a case of prickly heat. But the institutional turmoil set off by corporate belt-tightening, not to mention the individual anguish of layoffs and unsought "vacations," was unprecedented in the computer industry.

No question is therefore more pressing than whether the Great Softness is at long last dissipating. And the answer from first quarter financial reports and IDC spending surveys is hardly calculated to raise spirits: Spending is still down, and will remain so for a while. Enthusiasm for certain products (e.g., from Digital) is high, but IBM is acting as a drag on the entire market.

Dear "Gray Sheet" Reader,

When I founded the Gray Sheet 22 years ago, I was keeping track of 24 vendors, some of them forgotten participants like Philco and Clary, who produced something over 100 different models. And we had another name for the industry: it was Electronic Data Processing. So my newsletter became the EDP Industry and Market Report, soon shortened to the EDP Industry Report.

Some things haven't changed since then so much as grown. Some of the principal players of two decades ago, like IBM, Sperry, Burroughs, CDC, and Digital, are still major forces in the industry. And I like to think that the Gray Sheet and IDC have kept pace with this growth as computers have become a crucial, integral part of every aspect of our economy and culture.

But names can change. Some of the younger participants in our industry no longer even know what EDP meant. So starting with this issue, the official name of the Gray Sheet becomes the Computer Industry Report. I want to assure you, though, that as we prepare for our industry's exciting future, we won't forget our past: the Gray Sheet will still be the Gray Sheet. As long as I'm publisher, whatever the industry is called, the Gray Sheet will be the place to go to understand where it's going, and why.

Best wishes,

Pat McGovern

Patrick J. McGovern
Publisher

IDC INTERNATIONAL DATA CORPORATION
5 Speen Street / Framingham, MA 01701 / (617) 872-8200

The 5.2% revenue growth registered in 1Q1986 over the comparable period a year ago by the industry sample selected by the Gray Sheet hardly signals a sharp rebound. Unlike the usual fiscal scenario, IBM is a couple of notches below the industry average, with 3.6% growth. If Big Blue were removed from the picture, the rest of the palette would show over 6% growth.

First quarter is often a slow period for mainframe revenue due to user budget cycles and the normal breathing spell after vendor pushes to boost annual income with 4Q sales. For this reason the Gray Sheet also compared the relation of 4Q1985 and 1Q1986 results to the situation a year earlier. The percentage drop from 4Q sales was about 15% steeper this time, but for one reason only: IBM's blitzkrieg in the final weeks of 1985. Without IBM, the industry decline from 4Q results was actually marginally better this year than in 1985.

Another index of IBM's current problems is the sharp rise in Comdisco's revenue, up nearly 65% over 1Q1985. Instead of tailing off 10% from the fourth quarter the way it did a year ago, Comdisco's leases actually rose slightly over 4Q1985. Of course, many of these dollars also appear in IBM's ledger as sales to Comdisco, but user decisions to lease rather than buy can be interpreted as an indication of broad wariness about IBM's line of new products.

Nevertheless, if a significant proportion of the relatively weak rebound during the first quarter is specific to IBM, the growth rates achieved by Digital, Cray, and Sperry, let alone Compaq, are still exceptional. Moreover, IDC's surveys of user spending plans, now updated on a quarterly basis, do not contradict John Akers' contention that U.S. capital expenditures are continuing to lower the ceiling on information industry growth:

- Expansion in information systems spending in 1986 will be relatively modest, especially in the context of the Great Softness through much of 1985. Annual growth will likely be in the 8%-10% range.

- More MIS shops are spending less than they expected to than are spending more, though most are essentially on target.

- Even where budgets are growing, cost is the primary consideration.

The most succinct survey response to the question asking the two or three key issues facing information system managers was simply "costs: managing, containing, justifying." Management's concerns about cost control and payback on investment are not, it should be emphasized, niggling about the bottom line. The issue isn't belt-tightening -- it's that they want to know the waist size.

And also waste size, to be sure. Average information systems spending in the survey sample comprised 2.3% of overall revenue, but even more importantly, information processing has become an essential aspect of corporate culture. Planning for its most effective implementation should be high on the list of any company. Information managers who can't answer questions from the top brass about where they're going, why, and what it will cost, aren't doing their job. And vendors who can't answer them aren't going to get their business.

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U.S. INFORMATION SYSTEMS SPENDING BY CATEGORY, 1Q 1986
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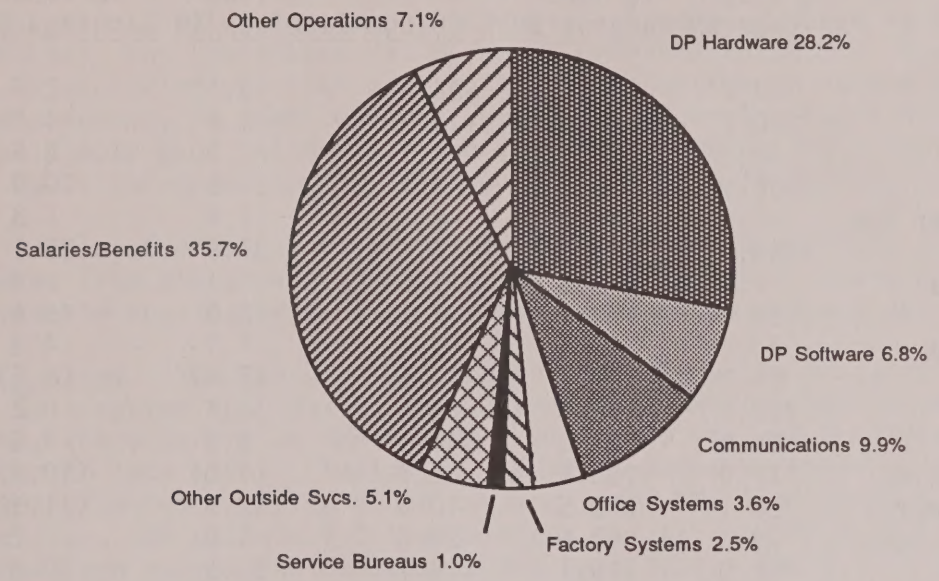

The leakage of information processing spending from IS departments to the end-user departments does not significantly alter the situation. While IS managers estimate that around a third of the money spent on information processing in their organizations is allocated through departmental budgets, they still have to track it and answer for it. Because most of that third goes for PCs, the only major result of decentralized purchases has probably been the growth of Compaq, which depends on indirect retail distribution for business uses.

What will matter more is how the pie is divided. The good news for information industry vendors is that, while IS budgets are not growing by much, more is being allocated for purchases and less for salaries. The percentage spent on hardware is about the same as last year; the arena of greatest expected growth, particularly in shops with budgets over $10 million, is communications.

As IS managers plan future expansion with ever-increasing prudence, it is incumbent on vendors to reciprocate in kind. This is not easy for entrepreneurs betting on rapid growth, or even organization men and women at business school models like IBM, to accept. During the nationwide IDC briefing sessions in early March, user attendees were asked about their 1986 budgets, while vendors were queried on their expectations of overall industry performance. The responses were strikingly similar: the average anticipated budget increase was 8.1%, while the average growth expected by vendors was 9.1%. But when asked about their own revenue targets, vendors expected to grow an average of 19.7%.

That way madness lies, as well as low profits. Much of last year's turmoil was the result less of low sales per se, than of the high inventories of parts and products created by expectations of growth that proved unsound. Everyone now claims to have learned the lessons of 1985, but one wonders how deeply the tutelage has penetrated. A key IBM official at the Convertible announcement mentioned that they're expecting an annual growth rate of 20-25% in PC ships for the rest of the decade. IDC expects IBM to achieve about half that rate.

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SELECTED INFORMATION INDUSTRY FINANCIAL RESULTS, FIRST QUARTER 1986
(Source: Company Financial Reports)

Company	1Q 1986 Revenue $M	1Q 1985 Revenue $M	% Change	1Q 1986 Earnings $M	1Q 1985 Earnings $M	% Change
Altos	37.7*	30.7	+22.8*	3.1*	2.7	+14.8*
Amdahl	200.2	177.6	+12.7	2.4	4.1	-41.1
Apollo	82.0	82.1	-.1	.5	8.8	-93.9
Apple	408.9	435.3	-6.1	31.8	10.0	+218.9
Ask Computer Sys	17.6	19.2	-8.3	1.4	1.8	-23.3
ADP	324.3	273.9	+18.4	31.9	26.1	+21.9
Britton Lee	7.2	6.5	+11.0	.1	.4	-82.7
Burroughs	1,136.0	1,167.1	-2.7	16.0	46.6	-65.7
Cipher Data	40.2	44.4	-9.4	1.7	4.3	-59.4
CCI	21.2	26.0	-18.5	(5.6)	(5.5)	-2.1
Comdisco	227.1	138.0	+64.6	16.4	8.2	+100.7
Compaq	144.0	97.0	+48.4	8.3	4.6	+79.6
Computervision	112.9	105.9	+6.7	(7.0)	(18.8)	+62.7
CDC w/o ComCrdt	796.1	890.5	-10.6	(42.6)	(11.5)	-270.4
Convergent Tech	73.5	92.6	-20.6	1.9	.2	+850.0
Cray	142.0	118.7	+19.7	30.9	30.8	+.1
Data General	318.8	320.2	-.4	(1.8)	9.1	-
Digital	1,928.3	1,691.1	+14.0	170.3	91.7	+85.8
Gould	341.6	348.3	-1.9	14.8	18.1	-18.2
Honeywell	1,502.0	1,480.0	+1.5	26.2	46.2	-43.3
Intel	280.1	375.2	-25.4	(22.2)	10.8	-
Intergraph	147.0	109.0	+34.9	18.0	14.3	+25.5
IBM	10,127.0	9,769.0	+3.6	1,017.0	986.0	+3.1
Lotus	69.3	44.7	+55.0	11.4	9.6	+18.1
MSA	29.4	25.0	+17.8	(.4)	2.7	-
Mentor	37.1	32.3	+14.7	1.9	3.1	-38.1
Microsoft	50.5	40.7	+24.2	10.6	8.5	+25.1
Miniscribe	40.3	23.9	+69.0	4.7	(12.5)	-
National Semi	328.9	394.5	-16.6	(32.0)	1.5	-
NBI	67.6	54.6	+23.7	(2.4)	4.0	-
NCR	960.8	842.7	+14.0	50.2	43.6	+15.2
Priam	36.2	29.2	+23.9	2.5	(4.8)	-
Prime	196.8	175.8	+11.9	9.2	12.0	-22.6
Seagate	127.0	40.4	+214.0	11.8	1.7	+598.5
Sperry	1,801.1	1,587.2	+13.5	115.3	105.9	+8.9
Storage Tek	161.5	162.0	-.3	5.0	(29.7)	-
Stratus	26.9	15.2	+77.2	3.0	1.5	+99.2
Sun	57.6	33.9	+70.0	3.4	3.3	+3.7
Tandem	176.3	146.5	+20.4	12.4	6.8	+81.4
Tandy	766.8	680.3	+12.7	42.0	2.9	+91.7
TI	1,145.2	1,287.9	-11.1	(23.8)	9.1	-
Ungermann-Bass	26.1	12.0	+118.5	.8	(.5)	-
Wang	685.3	552.7	+24.0	21.4	17.4	+23.0
Wyse	46.3	35.3	+31.0	46.3	35.3	+131.8
Xerox	2,133.6	2,024.5	+5.4	101.1	113.7	-20.6
Sample Total	27,386.3	26,039.6	+5.2	1,665.3	1,590.4	+4.7

*Excluding Altos' $11.4 million gain from the sale of an investment in an affiliated company.

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MAKING A MOUNTAIN OUT OF A NICHEHOLD: FAULT TOLERANCE TODAY

For what is in reality a fairly delimited market niche, fault tolerance seems a more popular concept than ever before. The number of users who need true fault tolerance is still fairly meager, if undeniably remunerative (particularly among banks), but the phrase has become a codeword for OLTP. Some users interpret it as equivalent to high availability, rather than a subset promising no downtime whatsoever; in that context, some vendors promise fault tolerance when they mean simply good reliability and some database integrity, while others offer fault tolerance as a wedge into the larger OLTP market.

The past couple of months have seen more than the usual quotient of fault tolerance claims from startups and established vendors alike. Taken together, they underscore the ongoing transition towards transaction processing.

Tolerant Systems. The January announcement of Tolerant's Eternity series finally gave it a system that justified the company's name (a non-fault tolerant standalone, which serves as the building block for the new multiprocessor system, shipped in late 1984). Employing the TP1 benchmark, Tolerant claimed that the Eternity system building block running under TX, its transaction-tuned Unix version, can process 8.0 transactions per second, more than any of its then-competitors except the fault-tolerant base Tandem TXP's 9.4, but its lower cost brought the price per TPS to under 60% of a comparably configured TXP at current prices. Moreover, Eternity's multiprocessing capabilities give it a foundation architecture upon which to pile future performance increments.

Tandem's Très Big System. If so, the Eternity series will have more than the TXP to beat -- Tandem's already done that. For a while Tandem seemed to have lost some of its momentum, but enough of its ships came in during the first three months of 1986 that quarterly revenue from new products was up 18.9% from 1Q1985. Moreover, recent product announcements indicate that in 1986 Tandem should be able to better last year's 12.1% growth, even if the 27.3% pace clocked by Tandem in 1984 is probably now beyond its reach.

The standard-bearer leading Tandem's troops will now be the NonStop VLX system, scheduled to ship later this quarter. The VLX's VLSI circuit technology, developed by Motorola in tandem with Tandem, offers what the company claims will be 1.6 to 2.2 times the transaction throughput of a TXP. The entry level four-processor system supposedly processes from 35 to over 50 ET1 transactions per second (let's say 40 in typical configurations) when full multiprocessing is underway, half that in fault-tolerant situations when a user employs half a system for backup. Literally hundreds of TPS are available if the system is expanded modularly with Fox II, Tandem's fiber optic controller that permits high-speed links at distances up to four kilometers.

The VLX sports a new fault-tolerant maintenance subsystem called Check, a melange of hardware, software, and firmware that works in conjunction with the maintenance/diagnostic software present in all Tandem systems. The widespread use of microprocessors to monitor CPUs, Fox II controllers, and power supplies makes the VLX a little more like Stratus systems than earlier Tandem models.

The new system is a significant move. Depending on their applications, some users might piggyback VLX modules for programs already written for their Tandem systems rather than buy Sierra processing power. In any case, they now have somewhere to go within Tandem, however far they finally choose to go.

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NCR Turns Fault-Tolerant. The Bunch member that has often acted least like a member of the Bunch, NCR has been a fairly consistent performer in recent years. Revenue growth in 1985 was 6%, not far below NCR's 9.2% 1984 expansion. Chuck Exley isn't making any promises for the rest of the year, but the first quarter of 1986 was exceptional, up $118 million for a 14% gain over 1Q1985.

NCR has traditionally profited by catering to special needs with application-specific offerings, but in recent years has added industry-standard hardware systems aimed at volume sales. Some have been splendid successes, notably the Tower Motorola-based Unix supermicros; others, like NCR's DOS-based PCs, have, despite the omnipresent Dom DeLuise (some might feel because of him), not made a significant dent in the market. NCR, of course, would like the best of both worlds -- a product playing off its strengths in market niches that sold in sufficient volume at high enough margins to boost its profit level.

That's what NCR hopes from its new 9800, an expandable system that it bills as the "evolution of the mainframe." Physically it is an evolution of the VLSI chip developed for the 9300 series running on an extension of the VRX operating system developed for the V8000 series. Recompiling will be necessary, though.

The 9800 mixes and matches between application processors executing programs and cache-rich data storage processors negotiating input/output to the storage database. System numbering is coded to the blend of APs and DSPs: the entry-level 9811 has one of each; a 9821 would have two APs and one DSP. Hence a 9822 would represent the first potentially fault tolerant 9800 system. Performance, especially in the DSPs, is accentuated with a RISC implementation.

OLTP price/performance is the real selling point. The 9884, NCR's largest current configuration, is only 4 MIPS in batch, but processes up to 52 debit/credit TPS for under $300,000. Marketing will center on the two-thirds of NCR's base that it calls financial and retail -- mostly smallish banks and companies that have not yet seriously dipped into OLTP but are ready to plunge in. NCR now has OLTP/fault tolerant hardware to persuade them to stay put rather than sashay off with someone else, even the Bunch's bete noire from Armonk.

Stratus and IBM: The SNA Connection. As impressive as Tandem's performance was this past quarter, it's still a tortoise next to Stratus, whose sales soared 77.2% compared to 1Q1985. On March 31, 1985, Stratus's revenue intake was only about 15% of Tandem's -- but a year earlier it had been only 10%.

It is taking nothing away from the Stratus engineers and management team to note that some of this growth is directly attributable to the imprimatur IBM gave to Stratus in early 1985 when it announced that it would OEM the Massachusetts manufacturer's fault-tolerant boxes. Much of Stratus' future growth therefore depends on the future of IBM's System/88. On April 16, IBM gave new indications on the short-term and longer-term answers to that question.

Late last summer IBM's Systems Product Division held a consultants' conference on the S/1 and S/88 in which the highest priority was placed on adding full SNA capability to the S/88. As noted in the Gray Sheet, Vol. 21, No. 13, November 7, 1985, speakers acknowledged that S/88's potential to crack the myriad of markets targeted could be significantly degraded if true-blue users did not view the incompatible Stratus systems as part of the IBM universe. IBM's first SNA offering, though, simply replicated gateway software already offered by Stratus, a step which did little to put the IBM stamp on S/88.

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Then this March Tandem added to its reputation as a leader in communication links between specialized fault-tolerant and IBM host applications by supporting LU6.2, IBM's nonhierarchical APPC (Advanced Program-to-Program Communications) protocol. A Tandem system with SNAX/APC therefore offered a wider gateway to IBM mainframes than IBM could offer on its S/88.

The April 16 announcements solved that problem -- or rather, promised to solve it in the first quarter of 1987, when five SNA-related programs, the first IBM has offered for the S/88 that were internally developed rather than borrowed from Stratus, will become available. Taken together (if you wanted to spend the $26,000 in one-time charges to take all five), the programs add up to the most extensive implementation of SNA on a fault-tolerant system:

- S/88 SNA Network Interface Support, the glue that allows any of the other four programs to work.

- S/88 Primary SNA, which gives SNA host (P.U.5) capabilities for networks with SNA products like the 4700 finance communications controllers or the 4730 personal banking machine.

- S/88 Secondary SNA, which allows a S/88 attached to a P.U.5 host to function as an SNA cluster controller (P.U.2).

- S/88 APPC, implementing the universal donor LU6.2 (P.U.2.1) for nonhierarchical communications.

- S/88 Communications and System Management, offering central problem tracking as an auxiliary for S/88 Primary SNA host functions.

Ironically, it is because these programs go far beyond anything offered by Stratus in the way of data interchange with mainstream IBM systems that they help insure the future of the Stratus-IBM relationship. Moreover, there seems no reason why a Stratus "S/88-compatible" user can't use the new IBM software.

The announcements also help to elucidate IBM's long-term plans for S/88. The aggressive marketing plans announced by SPD last year were difficult to reconcile with the push to add high availability across the rest of SPD's intermediate systems. However, the decision to move both S/1 (already dubbed "the communicating 1s") and S/88 from SPD to the Communications Products Division suggested a more limited, but potentially more permanent, S/88 role.

In other words, the IBM sales force can still trot out the S/88 if users specifically request a fault-tolerant solution, but the primary implementation of the S/88 will be in one of two communications/networking guises:

- OLTP communications processor. The April 16 announcements make an argument for using the S/88 to manage and monitor the data flow between an IBM mainframe and peripherals in an OLTP environment, since it could not only transmit transactions from SNA terminals to a host but could serve as a completely riskfree temporary host if the mainframe burped.

- LEN subhost. IBM has intimated that SNA will permit host-autonomous distributed processing, but its Low-End Networking (LEN) did not until April 16 offer P.U.5 capabilities except on S/370 processors. Allowing P.U.5 and LU6.2 (P.U.2.1) through S/88 is a step towards blue-hued distributed processing.

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• BLUE MOVES. IBM has been showering April announcements designed to pierce the drought of March (not to mention January and February) to the root.

The least surprising move has been to nudge 3090-400 shipments up to October. Few in fact would be astounded if it shipped even sooner, maybe as early as August. Shipment of the 150 has been accelerated to June.

The least anticipated action was selling the IBM retail stores to Nynex. IBM joins Digital and Xerox in recognizing that marketing prowess in highly focused corporate sales does not translate into effective retail strategy, since most consumers go to stores to comparison shop, not to be wrapped in a fuzzy blue security blanket. IBM can now direct-sell exclusively in the channels where it knows how to sell as well as or better than anyone else, and let others cater to the walk-in trade. Moreover, IBM gets a cash infusion in lieu of the relatively nonproductive Product Centers. What they will bring to Nynex as Datago Business Centers is less clear. This is not an auspicious moment to expand retail distribution channels dramatically. Probably the biggest winners will be IBM PC-compatible vendors, from Compaq and AT&T on down, who now have a passkey into 81 outlets from which IBM had excluded them.

Something that was bound to happen eventually was word that IBM will offer no new 8100 models, a necessary first step towards cleaning up its distributed processing stable of six different lines running on twelve operating systems.

• SIERRA MEGABIT CHIPS. To remind people that IBM can act as well as react, it has trumpeted the first commercial use of megabit chips in the central storage of 3090 systems. It hasn't indicated how it will use the space it is saving with chips that can each store over six issues of the Gray Sheet.

• POTENT UNIX FROM CCI. Under John Cunningham's leadership, Computer Consoles is increasingly focusing on the OEM trade with hot Unix boxes. CCI has announced two new models in its Unix-based Power6/32 series, an entry system supposedly yielding around 5 MIPS (3 less than the original 6/32) and a multiprocessor model scaling new supermini heights at the 15 MIPS level. Meanwhile the company has signed an agreement with Sperry to coordinate marketing of Unix superminis to RBOCs (a not unreasonable attitude, since CCI OEMs medium-scale systems to Sperry), reiterated its faith in the future of Unix in the office, and reentered the fault-tolerant market with a Power6/32 model running a Unix-compatible operating system optimized for fault tolerance and OLTP.

• MORE UNIX FROM SPERRY. With new OEMed models from NCR and Arete, Sperry has beefed up its Series 5000 line of Unix small-scale systems with 68020 performance. Possibly the new negotiations about NCR's Tower supermicros misled the investors who sparked the recent rumors about an impending merger.

• PRIME BEEF. New high-end superminis give Prime users what the company clocks at 3.4 MIPS (the 9755) and 5 MIPS (9955 II), plus a new disk subsystem from CDC and the first non-IBM implementation of SyncSort's sort/merge/copy software. By claiming the best traditional supermini price/performance around, Prime indicates that it doesn't believe DG's performance figures.

• APPLE PROMISES. After replacing the standard 512K Mac with an enhanced version with Macintosh Plus-like features like more memory and storage, Apple vowed that now that its fat-trimming has engorged profit levels, it will begin to concentrate on selling computers and turning the revenue column around.

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